VOL. XVII. No. 2. APRIL, 1907.

THE MONIST

A QUARTERLY MAGAZINE

Devoted to the Philosophy of Science

Editor: Dr. Paul Carus. *Associates:* { E. C. Hegeler. Mary Carus.

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The Open Court

... An Illustrated Monthly Magazine ...

DR. PAUL CARUS
EDITOR

ASSOCIATES { E. C. HEGELER
MARY CARUS

Devoted to the Science of Religion, the Religion of Science, and the Extension of the Religious Parliament Idea.

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THE MONIST

CHRISTIAN SCIENCE: MEDIEVALISM REDIVIVUS.

DR. John S. Billings, U.S. Army, reviewing the progress of medicine during the nineteenth century, has shown that deaths of women from childbirth decreased during that period from 10 to 20 in 1000 to 5 in 1000; and that from all causes the deaths in New York City fell from between 35 and 40 in 1000 to less than 20 in 1000. He recalls the fact that one hundred years ago yellow fever was epidemic in New York and Philadelphia for two years; (for thirty years the disease has been almost unknown throughout the whole country;) also that in 1800 the majority of persons one met were pitted with smallpox—the survivors of a much greater number,—while now there are physicians who have never seen a case of smallpox; and that in the Napoleonic and Revolutionary wars more died from disease than from wounds, while now hospital gangrene is unknown.

Statistics show that in Chicago during the last thirty-five years the average age at death has increased from 12 to 32 years.

No one disputes these facts, or attributes them to any cause other than medical science—the measures employed partly in curing disease, but more especially in preventing its introduction, or its spread when once introduced.

Yet, notwithstanding these facts, Christian Science

has the effrontery to say that "The world is exceedingly tired of the medical profession—a profession as changeable as the skies,"—and it offers itself to suffering humanity instead, as something not only unchangeable but divine—unchangeable because divine.

St. Augustine in the fourth century declared, that "All diseases of Christians are to be ascribed to demons; chiefly do they torment fresh-baptized Christians, yea even the guiltless new-born infants."

It is a long reach of time from St. Augustine to Mrs. Eddy, and during that interval it has been supposed that knowledge of the human system had made some progress. Yet perhaps we have been laboring under a great mistake after all, for we find that between the old saint and the woman of Concord there is not much difference either in belief or practice. The terms do not exactly coincide, but the ideas are almost identical. Both have denied that disease is disease, both have relied on supernatural means for relief, both have scorned natural means as not only ineffective but impious.

But how has this new system, which appears to be nothing but a reversion to primitive methods, or a reinvestiture and restatement of outgrown beliefs, been able to gain a hearing and a considerable following? Prof. David Starr Jordan indirectly answers the question when, in another connection, he says:

"The sole condition under which communistic and socialistic organizations have been successful is that of complete subordination of the individual wills to the the will of some one individual supposed to have mystic power or a divine mission."

The answer is also found in the very systematic methods of advertisement and organization employed in the propaganda.

THE ADVERTISEMENT.

About ten years ago Mary Baker G. Eddy published a book entitled *Press and Pulpit,* a compilation consisting partly of reports of lectures and addresses on the subject of Christian Science, but chiefly of extracts from various newspapers, ostensibly giving the views of editors on the same subject. That part of the book which is accredited to the pulpit, however, consists merely of the views of Mrs. Eddy's First Readers and reverend lecturers, some of whom were ministers in other denominations before they embraced "Science." Naturally it would be expected that their words would be commendatory, and since the extracts from the newspapers were selected by Mrs. Eddy herself, they also, as a matter of course, are such as speak well of her and her church; it would be most surprising if she had published any other kind. Mr. Septimus J. Hanna, her historian, confidently asserts of the whole collection, that "They accord fair and sincere recognition of her achievements and her rightful place in history." But who wrote them?

Press notices are always liable to the suspicion that they are either inspired or written wholly by parties in interest. In the case of concert singers and composers of popular music, for example, those who have had experience in their exploitation know how easy it is to procure encomiums for their artists by the hundred. Even those not conversant with these tactics, the ones it is desired to influence to become patrons, have become a trifle skeptical as to the reliability of the fulsome praise which the newspapers print, and they generally require something more undeniably spontaneous and sincere before giving up their money.

If it is a show or a play, it is patent to nearly everybody that the press notice is a part of the regular advertisement

which the advance agent prepares and places. He is hired to do that particular work. He may quote from other papers, but he also wrote the words he quotes.

Press and Pulpit having passed through seven or more editions, it is evident that its compiler and editor must regard it as of considerable value and importance; and if it is intended to serve the same purpose for her which the bill boards do for the circus, no one need complain; the field is open, and she has the same right to "keep everlastingly at it" as the shows have. If it is expected, however, that men at large will take it as real, unbiased testimony, then that presupposes an innocency on their part as great as that of the children and farmers (unfortunately sometimes found too), for every page points to a Christian Science writer. The skill shown, however, in the manipulation of the press is quite remarkable. So cleverly has it been done that the articles which have been gathered together in *Press and Pulpit* appeared in the first place, not as interested puffs, nor like the palpable work of the advance agent, nor even (as they ought to have been printed) as signed letters, but as if they were the very editorials Mr. Hanna would have us believe them to be. Unsuspecting readers at the time no doubt took them to be such, and even in the book it is only by the frequent cropping out of the familiar cant phrases of Christian Science that the real authorship stands revealed.*

The charlatans and quacks are given to straightforward lying. Christian Science is more discreet—perhaps I ought to say conscientious,—and yet *Press and Pulpit* being something else than what it pretends to be, by what soft words shall we characterize it?

*Nothing more than this evidence which they bear upon their face is needed to confirm the view that they were all written by Christian Scientists, but I have additional corroboration of it from some of the editors who have permitted their columns to be used by those writers.

PUBLICATION COMMITTEE.

As a supplementary force in the advertisement, there is an organized body of men and women scattered over the country known as the Publication Committee whose duty it is to keep a sharp lookout for newspaper and magazine articles which show "lapses" toward Mrs. Eddy, and when found to answer them—"in a Christian spirit."

The menageries sometimes cause exciting accounts to be published, of how a lion escaped from his cage and broke the bones and tore the flesh of the other animals. The fierce attacks of men on that gentle creature known as Christian Science do really occur, but in answering them the Publication Committee do not fail to utilize the occasion to the full by calling attention at the same time to the fascinating, wonderful and truly pious character of their system. In fact, they do not need to be attacked—any allusion to the subject will be found sufficient to draw them out, such opportunities if properly handled being quite as effective, in their judgment, as the more direct appeal of the alleged editorial.

LECTURES.

Through its Board of Lectureship the system is explained to the public in a manner calculated to attract the attention of the more intelligent class, by setting it forth in such a light as to require as little of one's credulity as possible and yet be consistent; appealing to the religiously disposed by frequent references to the words of Jesus and his disciples, and arguing throughout with a speciousness not excelled in politics, and seldom equaled in the practice of law.

"You may have read some of the testimonies as to cures, which possibly appeared to you extravagant. Very

well; we don't ask men and women of your intelligence to give them undue attention until you know something of our methods and resources. But come to our lectures and we will uncover to you something worthy of your most careful attention."

Imagine yourself, therefore, ushered into a comfortable seat in some good theatre on a Sunday afternoon, amongst an audience of well-bred men and women, breezy and cheery, with none of the sanctimonious air of the church congregation, yet very earnest; no hint of money—no "silver collection" at the door, nor passing of the plate;—soft music from a piano down in the orchestra for five or ten minutes, and then the lecturer and his introducer—a local officer of the church— step upon the stage.

The introduction is a memorized recitation of a most carefully prepared prelude, evidently brought by the lecturer in his pocket, or forwarded in advance, for nothing is left to accident. The speaker, a graceful gentleman, beaming with kindness, almost apologetic when criticizing the profession of medicine, though obliged to smile at some of its amusing fallacies—particularly the theory as to germs;—with charity for all who, through misapprehension, have misrepresented Mrs. Eddy and her teachings; with an earnest wish that you should correctly understand this health-giving and satisfying revelation for your own greatest good, asking if you are satisfied with yourself now, —talks entertainingly, plausibly, for an hour and a half, holding the attention so closely that time is unnoticed, and the only sound—which you rather seem to feel than hear—is the deep-breathed approval of the believers among his auditors. And when it is over, if you are not convinced you almost wish you might be, so charming has it all seemed.

Those who make up the audience of one of these lectures are mostly persons of ordinary attainments only, hav-

ing been drawn thither by no particular interest, yet with no particular prejudice against the subject, because knowing little or nothing about it, many of them church members, they form an ideal assembly for the purpose aimed at.

And the first aim is to remove any doubts that may exist as to Christian Science's being antagonistic to Christianity, or anything else than Christian in all its essentials. It is shown, apparently, to be in fact a rediscovery of Christian first principles, and a return to a practice of them —a revitalization of a lot of Scriptural injunctions and promises which have for a long time been neglected,— which will appear at length as the only true and complete Christianity. How can that be more than a half-Christianity which confines itself to soul-saving only? This saves both soul and body. (It might be asked here, why a person need ever die then;—but that is a question our friends are not eager to have raised.)

The "little book," *Science and Health with Key to the Scriptures,* the Christian Science text-book, it is declared, sheds a flood of light upon the Scriptures, which not only makes them wholly reasonable, but as applicable to life now, physical and spiritual both, as to the times in which they were written. It is asked: "Is the great Healer dead, or is He the same yesterday, to-day and forever?" What is the meaning of the words (James v. 15), "The prayer of faith shall heal the sick"?

After showing how much ground there is to justify the use of the word *Christian,* and for regarding Christian Science as in reality applied Christianity, the lecturer proceeds to so handle the words *sin* and *disease* as to make them appear to be synonymous, and then leads up to a denial of what they stand for in human life. Evil, sin, disease—these can be used interchangeably at will, and are so used in all Christian Science literature as well as

in lectures. Their *unreality* is set forth by Rev. W. P. McKenzie, as follows:

"It is a distinctive feature of Christian Science that its postulate, rather should one say its axiom, is this: that by proving the unreality of sin, disease and death, you demonstrate the allness of good."

Mr. Hanna, in a lecture delivered in Parkersburg, W. Va., February 28, 1905, said: "Evil is unreal. Sin is real as a human belief, but not as a divine fact."

These statements are unique, if not wholly intelligible; but they make it plain that disease is, in their philosophy, not real. When, however, an outsider asserts that its reality is denied, he is immediately charged with misrepresentation.

Richard P. Varall, in a letter to the *New York Sun*, March 8, 1904, written for the purpose, as he states at the outset, of "correcting a very popular misapprehension—that Christian Scientists do not believe in the reality of sin and disease in a literal sense," said: "No body of people recognize the seeming (!) existence of sin and disease more than do the Christian Scientists, and one of the best proofs of this lies in the fact that the sinful are regenerated and the sick healed by its means."

"The admission that 'God is All in All' logically contradicts the belief in the reality of evil. To be loyal subjects of an all-powerful God, we must not even in thought believe him capable of such imperfect work as that evidenced in the sick and sinful progeny of Adam. The only possible escape from this dilemma is to agree with Mrs. Eddy in her deduction, that spirit and matter being opposite, the latter must be unreal if the former is real..... Those who have mastered its teachings (Christian Science's), even in a small degree, can prove in part to themselves and for others the unreality of sin and disease." Mr. Varall is a member of the Publication Committee.

This letter of explanation needs explaining. At a casual reading it appears to be well-nigh meaningless, but it is really a deft piece of sophism, for it contrives by identifying disease with evil to confirm the impression it ostensibly seeks to remove, and reaffirms the very statement it pretends to refute. And it will not be overlooked that this official denial of the reality of disease either goes too far or not far enough. If disease is not real, then what is it that the treatment cures? If the cures are veritable, then the disease must have been real. Something which is not cannot be removed, or else there was no removal. And what kind of a deduction is that of Mrs. Eddy's which he refers to, which makes spirit and matter "opposite," and *because* they are opposite therefore one must be unreal? If one is unreal how can it have relations?

It is charged that the opponents of Christian Science do not understand the subject, and when we come to points like these—the removal of something which did not exist, and the opposition of two elements, one only being real—we may as well admit that we do *not* understand it. More than that, it is not too much to say that nobody else understands it—it defies the world.

CURES.

More than most other Christians, these "scientists" regard their faith as amounting to knowledge—a knowledge which is demonstrable in the changed conditions of their bodies from a state of disease to a state of health; hence to intimate that they are the victims of illusions, or that they are guilty of exaggeration, is to raise an indignant protest; but there is much ground for suspecting the influence of both.

Ninety per cent. of those who acknowledge allegiance to Mrs. Eddy claim that they have been cured by "Science"

of physical ailments, which they are always ready to enumerate, prefacing generally by a statement made familiar by patent medicine advertisements—that he or she had been given up by all the doctors. And such wonderful cures as they relate! In reading the *Leaves of Healing*, published in Zion City, we may have thought the limit had been reached that would dare be asked of our belief as to cures. But if we did it was because we had not seen the *Christian Science Sentinel.* That paper every week prints from two to four pages of testimonials from grateful cured ones, which make the alleged work of all the other healers, by whatever name known, from the no-cure-no-pay men to Sanford and Dowie look small and tame.

In one issue alone of that paper (May 14, 1904) we read of a case of rheumatic gout being cured in forty-eight hours, a crushed heel and ankle restored to soundness in four days, a rib broken in the morning made whole before sun-down, "internal decay" arrested and cancer and consumption cured by reading some chapters in *Science and Health;* a person made able to fill a responsible position as bookkeeper and cashier without any previous training, and a case of *atheism* overcome without the slightest trouble—length of time not stated, but presumably short. One woman asserts that she had been operated on twice and had twenty-four physicians in three years. Christian Science cured her at once.

In the issue of Nov. 14, 1903 another woman says:

"I was operated on for a spatulated fibroid tumor, when it was revealed that the disease was cancer of the uterus, and not removable.

"In this condition I was in the care of physicians and nurses for two years, and at last realized that death was the ultimate. At this point, a Christian Science friend called to see me, but was told that no one was admitted, as I was dying.

"I was then suffering great agony, and all opiates failed to relieve me, although a nurse and physician were in constant attendance. My body was swollen to an enormous size, until further expansion seemed impossible, and septicæmia had set in.

"This condition was regarded as the approaching end. The third day there seemed no change until late in the afternoon, when I was seized with a most terrific pain and sensation of something ripping and tearing itself loose, when with one jerk, as it were, I realized that I was freed of the incubus that was dragging me down to the grave. I called to my attendant and daughter, declaring to them, that whether cancer or tumor it had passed from me. They thought I was suffering hallucinations and tried to quiet me, but I insisted that they remove it and send for my physician to come at once. When he arrived with another they were dumbfounded and said there was no account in *materia medica* of any similar experience, and attributed it to a freak of nature. The growth was pronounced a cancer, leaving behind no trace, for every fibre, and the throat, or main attachment, was complete. They carried it away with them and it was the subject of much discussion at the health office. (Sic!)

"They now held out no hope, for the verdict was death from hemorrhages. To me a miracle had been wrought, and I knew it was of God, yet I did not know I was being treated in Christian Science. In one week I was about the house and continued to improve. In three months I started on a trip across the continent alone, and was well in mind and body, even though the physical condition was not perfect to material sense. When told by my daughter that I had been treated in Christian Science, I accepted the statement and was satisfied."

Dr. Tomkins says: "The sick have been healed of every imaginable disease, including insanity; the blind have re-

ceived sight, the deaf their hearing; shortened limbs have been elongated, crooked spines have been straightened, and law after law of the human mind's bondage have been broken." Almost the only affliction *not* claimed to have been cured is decapitation, but that may be due to an oversight on the part of the relators.

If now we believe in the actuality of these extraordinary cures it becomes necessary to admit that they are *miracles*. And they are occasionally called by that name, even by Mrs. Eddy herself, though there is a growing reluctance, evidently, to speak of them as such, probably through fear of prejudicing the cause.

EXAGGERATION.

Some are exaggerators by temperament. "All their geese are swans till we see the birds." Some are so from policy. I once knew a physician whose sore throats were all diphtheria, whose fevers were all typhoid, whose coughs were incipient consumption. He was very successful in his practice. In fact, *all* who had these serious complaints got well. A suspicion got abroad, however (set afoot by his jealous rivals, probably), that his diagnoses had not always been quite right.

It may seem unkind, perhaps, to suggest that our Christian Science practitioners have indulged in any hocus-pocus with their patients, stretching the truth a little to make the ailment appear greater than it was, that the triumph of the restoration to health might appear the more wonderful. But it is somewhat surprising to observe that those who have been cured appear to know so much about the nature of their complaints. One is tempted to ask, How did they know they had "internal decay," crushed heels, broken ribs, consumption, cancer, etc.? If they think that the cure of that which they thought ailed them proves

that the ailment was what they thought it was, that may be a process of reasoning satisfactory to themselves, but to those uninfluenced by any spell, it seems to have its faults.

As an influence tending to produce an over-drawn picture by the patient herself, we may recall that there are writers of patent medicine advertisements who receive large salaries for their ability to so describe the symptoms of a disease that the reader shall think he has it. It would not be strange if some of those persons who have been so miraculously restored to health from incurable diseases had been reading such advertisements along with *Science and Health.*

In the most ordinary occurrences of every-day life, the person who describes them with exactness is rare if not unknown. The thermometer is never high enough on a hot day, nor low enough in a cold one, to match the stories which are told about it. No season was ever so severe; no climate so changeable. Startling occurrences, like fires, runaways, railway collisions, homicides, etc., no two persons will describe alike—no one will describe the same event alike twice. Let a description pass from mouth to mouth a few times and its relation to the real facts becomes unrecognizable. The little brook trickling down the mountain side becomes in the valley a mighty river—no more than keeping pace with the fish stories connected with it, however.

In times of religious excitement, when the imagination is aflame, or when the nerves are unstrung through disordered physical states, more especially when such conditions exist together, the subject is pretty certain to lose his bearings completely,—his mind will for the time being resolve itself into a chaos. Then not only will he exaggerate, but his statements may all become untrustworthy. Let one in such a state of mind then, by any means have

confidence in himself restored, and the difference in his feeling will be so great—the feeling of relief so intense and profound—that he can even believe (as Mrs. Eddy did in her own case) that a miracle has been performed. Only those well-disciplined in such matters are competent to understand the relations of sequences in vital affairs,—scarcely anybody who is at once both subject and diagnostician. When a doctor is sick he always calls in a doctor.

COINCIDENCES.

Charlatanry avails itself of all the accidents of fortune, for it is more anxious to make a case than to unveil a truth. Suppose a man had predicted the Galveston cyclone eight or ten months in advance of the event, many would have believed that he had a fore-knowledge of it. Or, suppose a prediction is made of certain other impending disasters, and then there follow a series of occurrences in seeming conformity to it, thousands can be made to believe that the forecaster has occult powers by which he sees events in advance of their occurrence.

Wonderful coincidences happen, as we all know, sometimes seeming to imply a relationship of cause and effect while in reality proceeding from causes remote and wholly distinct from each other. Herschel's weather tables compiled with reference to the phases of the moon furnish a notable example of such a misconception.

But whether the subject be the weather, a flood, a tornado or a miracle, the man who makes claim to know all about them, to be able to foretell them, to forestall them, or produce them, if he only has sufficient assurance, can get followers, and, with shrewd management, proofs. What nostrum and what quack who is worthy of the name that have not as big bundles of testimonials from those they

have cured as Mrs. Eddy probably? Many of them are just as sincere too.

Now suppose it is admitted that the Christian Science cures are real, that is, that the disturbing influences of imagination had been absent, that the complaint was precisely what the patient afterwards (always afterwards) said it had been, and that under the exclusive treatment of the healer she had been made entirely well,—what is proven thereby? Manifestly nothing for the main contention, for it is common enough for sick persons to recover without any attendance whatever, even also when some desire that they should die, and in this case nothing but attendance was given, coupled presumably with the desire for the patient's recovery. It is a perfectly fair presumption that the recovery came about naturally.

Taking the same data which are furnished by the actual Chrisian Science subjects it is just as easy to prove something else as to the cause, manner and nature of their recovery as that it transpired as claimed. For example, referring again to the case of the broken rib said to have been restored in a few hours, the cure might not have been of the rib that was broken, but a new rib may have been caused to grow in place of the old one, which may have been absorbed, or jerked out like the woman's cancer. The supposition as to a new rib is no more incredible than that respecting the old one, and the proof is just as conclusive, for the man went into the hayfield in the afternoon and worked as freely as before his injury.

Just here we are likely to be asked, If Christian Science did not cure the man then what did? And perhaps we cannot say. The most obvious answer would be, if we were not for the moment assuming that the ailments are what they purport to be, that the man's rib was not broken, therefore not mended. Nobody of ordinary common sense,

outside the spell of this strange belief and practice, would make any other answer.

CONTENT.

If this were merely a harmless *fad* which we are considering, and if it were not spreading fast, it would not be worth while to add anything to what has heretofore been done in the way of exposing its worthlessness,—time alone will do that. Its rapid spread among all classes, however, and the menace to health, public as well as individual, through the neglect of rational, precautionary and remedial measures, which a close following of it requires, make it a danger large enough to merit still further scrutiny. Its rapid increase is one of the marvels of the times. Five years ago the number of its devotees was estimated at 700,000, and to-day it is put at 2,000,000, and the Christian Science Church as occupying eighth place among religious bodies.

Its members are devout, sincere and kind, always optimists, and as regards their belief enthusiasts. Its preaching is solemn and impressive, abounding in reverential allusions to the Bible (always with "Eddyotic" interpretation), and heavy with a phraseology supposed to be scientific and metaphysical. Its atmosphere is, on the whole, pure and sweet; and in many other respects it compares favorably with other denominations. And yet it is not in any nor in all of these that Christian Science consists. If we would know what its essentials really are we must look for them in precisely those qualities which are unlike those of any other Church. Briefly they are comprised in the substitution of faith for knowledge in the treatment of the sick. All its preaching, all the lectures, all the Wednesday night experience meetings, all its literature, have that one end in view. Nothing is essential that does not bear upon this one point—healing; it exists for nothing else. More

particularly, it is a system of healing based on Mrs. Eddy, a more than mortal woman, gifted with prescience and the power of working miracles,—a power which she imparts to her followers by instruction, but which also resides in her book, *Science and Health.*

That it is a faith cure or mental healing simply is denied. To make this plain, she "dwells particularly upon the terms *belief* and *understanding*, which are the key words respectively used in definitions of faith cure and Christian Science," asserting that "the latter is based on what is held to be scientific certainty, namely, that all causation is of mind, every effect has its origin in desire and thought."* She became "certain" of this in 1866. This is the "Discovery," which Mr. Hanna refers to, as follows: "She discovered the science of healing embodied in that work (*Science and Health*) after years of practical proof, through homeopathy (!), that mind instead of matter is the principle of pathology, and finally sealed her proof by a severe casualty, from which she recovered through her exercise of mental power over the body, after the regular physicians had pronounced her case incurable."

If such words mean anything they mean mental healing. And as *mind* is one of Mrs. Eddy's numerous synonyms for God, the meaning is also faith healing. In fact, faith in her and God (*Hoch der Kaiser!*) is fundamental and necessary to becoming one of her followers, much more so to becoming one of her wonder workers.

THE DIVINE WOMAN.

One of the lecturers speaking in Detroit, February 13, 1899, said: "She is a second great Mary who has taught the world to know God." Mr. McCracken in a lecture at Lewiston, Maine, last year, said: "The name *Christian Science* was an inspiration." Rev. Geo. W. Tomkins in

* *Christian Science History*, by Septimus J. Hanna.

a lecture at Buffalo, said: "We consciously declare that *Science and Health with Key to the Scriptures* was foretold as well as its author, Mary Baker Eddy, in Revelation x. She is the 'mighty angel,' or God's highest thought* to this age (verse 1), giving us the spiritual interpretation of the Bible in the 'little book' *open* (verse 2)."

In the same lecture he also said: "THE REVELATIONS OF CHRISTIAN SCIENCE came to Mary Baker G. Eddy in the year 1866, and its truth and power were immediately demonstrated by signs following."

At the dedication of the beautiful new Christian Science church at Concord, N. H., July, 1905, the speaker said: "Mrs. Eddy was sanctified before she had birth"—not exactly a claim to an immaculate conception, but suggesting great possibilities for the future. If we may judge by present tendencies, we may perhaps be called on to contemplate her after she has left us as a fourth person in the Godhead. Shocking as these words must seem, they are not without foundation, as all know who observe the close approach to worship† which her votaries already manifest towards her,—their hushed and reverent attitude when she

* The assertion as to "God's highest thought" seems rather venturesome, for to know which is His *highest* thought requires a knowledge of *all* His thoughts. Besides, it has not been supposed heretofore, I believe, that the divine mind was differentiated into grades.

It seems unfortunate, too, for the gentleman's declaration, that in the two verses cited the mighty angel is spoken of as *he*. Elsewhere in Revelations whenever the subject is a woman the sex is always indicated by the pronoun *her*.

At the close of the chapter in which these verses occur, we read: "Thou must prophesy again." This would seem to be a singularly appropriate suggestion for Dr. Tomkins to have taken to heart as pointing to him.

† On Thanksgiving Day of 1905 her church in Concord addressed to her the following Prayer of Thanksgiving: "Beloved Leader and Teacher: We members of the church of Concord, whose beautiful edifice is your precious gift, earnestly desire the first glad Thanksgiving Day in our new church home to thank God for all the blessings that are ours through your wisdom, self-sacrifice and patient devotion to truth's holy cause. We are grateful for the respect which you have given us which has so blessed our lives and is blessing the whole world. We thank you for your unselfish labors. We share with you this joy in the general recognition by Concord's representative citizens of your life and of the abundant evidences of your successful endeavors to lead mankind to God and to the knowledge of His son, our Lord and Master, Christ Jesus."

passes by, standing in lines, hats off and tears in their eyes, while she slowly rides through with her carriage curtains raised high so that all may see—a vision seldom permitted. One is reminded of a May Procession to the Virgin, or of that event which Palm Sunday commemorates. Her "messages" are received with more deference than most Christians pay to an Epistle by St. Paul. Her "little book" occupies a place not inferior to—some times above, it would seem—the New Testament, which needed her *Key* in the same way that the Old Testament needed the New. And to fix her status still more firmly as that of no ordinary mortal, Rev. Irving C. Tomlinson, her minister in charge of the Christian Science church in Concord, said "Through her the vital, healing ministry of the Founder of Christianity is again preached on earth."

Whether Mrs. Eddy believes so much in her own divinity may be fairly doubted; yet such an implication follows from her alleged supernatural gifts and powers, and it sticks out from nearly every page she writes; and that she is not averse to having such a notion prevail is evident when we observe that the claims to that effect made for her by her authorized exponents—her lecturers and the official organs of the church—meet with no rebuke, but on the contrary, with a complacent silence.

It appears, then, that the "Discoverer and Founder" (capitals always, please—she never fails to use them when writing of herself) was illumined and ministered unto, like the prophets, apostles and saints of old; she was endowed with sanctity before birth; she has a supernatural insight* into Scripture and the essence of Deity, and her book (made to look like a Bible) is a miracle-working fetish.†

* "How can one acquaint himself with God? By studying *Science and Health with Key to the Scriptures,* and other works by Mary Baker G. Eddy."—*Christian Science History,* by Septimus J. Hanna.

† "Those who studied this book in connection with the Bible found them-

Such amazing credulity as all this calls for would be inconceivable, especially when found among men of education and refinement, if we did not see that it becomes necessary in accounting for the results claimed to be produced. Even as it is there is a tendency to hedge. Such extravagant language as that contained in the address of Dr. Tomkins (that address still industriously circulated as a Christian Science Tract, however,) from which quotation has been made above, is not often indulged in at present. More discretion is being used. Yet the attest forces the assumption. *Miracles cannot be performed without miraculous powers.*

THE HARVEST.

It has appeared astonishing to many that in this day of enlightenment it should be even proposed to reinstate practices the counterpart and equivalent of those which originated in ignorance and superstition, and which prevailed before the revival of learning; much more astonishing is it that such a proposition should meet with any success. And yet the propaganda of this cult is so ingratiating and persistent, so backed up by seeming proof and apparent scriptural authorization and command even, that our tender-hearted, conscientious, but easily bewildered Christians are being led into camp with Mrs. Eddy every day, for they are made to believe that their only alternatives, if they are not to become hypocrites, are, either to go with her, or to deny God's power. Not so many have taken the step as are ripe for it, but they are only putting it off, yet realizing its inevitableness. Already Mrs. Eddy has said that her believers must not be-

seives able to heal the sick, and cast evils out of themselves and others."—Rev. Wm. P. McKenzie.

"Many have been healed by its perusal alone, to my personal knowledge." —Dr. Geo. Tomkins.

long to other communions, and a second more imperative command will surely come, demanding that they break their old church connections altogether and go where they belong, or else forfeit their rights and privileges as her sons and daughters. Ye cannot serve two masters when one of them is Mary Baker G. Eddy. The regular churches are filled with just such ones.

Even the Church of England is being invaded by these ideas. Rev. B. S. Lombard, vicar of All Souls, St. Pancras, London, is proposing to incorporate "scientist" features in his work. In an interview he is quoted by the *Pittsburg Gazette* of Sept. 3, 1904, as saying: "There is undoubtedly something in faith healing which we of the English Church do not understand. These 'scientists' have the power of effecting cures, and we of the Church must see if we ourselves have not the power."

In fact the infiltration of these ideas throughout most of the churches is going on at such a rate that it would not be surprising if in less than twenty-five years as great a transformation should take place as that which occurred in this country during the first quarter of the last century—the movement towards Unitarianism,—when during one year alone (1819) 150 Orthodox Congregational churches without changing the occupancy of the church buildings, or the society membership, even retaining the same ministers, declared their adhesion to the doctrines preached by Channing. The leaven had been working quietly but irresistibly, just as it is now working; and the result was scarcely a surprise, just as the result in this case will be discounted in advance, because this membership will find that they also have grown out of their old beliefs into the new, and the only change necessary will be a change of name.

Those who regard this movement as merely a passing *fad,* soon to disappear, are closing their eyes to the evi-

dence which looms large out of the rapid increase of societies, and the numerous defections from the churches of every faith to allegiance to this very insinuating new neighbor.

NOT A SCIENCE.

Great wrongs have been perpetuated in the name of religion. But now truth and reason are made to suffer in the name of science.

If Christian Science vigorously searched through the data which come to its hands from its healers and the healed, classifying the facts according to some strict method by which all disturbing and doubtful factors were eliminated, taking its cases and holding them up to every possible light, inquiring in the first place whether the complaint was what it was said to have been, who said so, and what was his warrant for judging and his reputation for correctness in general in making diagnoses; and next, as to the competency of the patient to hold herself free from undue emotion and delusion of the senses, not given to exaggeration, or moved by an excessive zeal to prove anything for or against this or any other system or school, requiring, in fact, that all the evidence must be of a character capable of standing any test which may be put upon it, such as a trial in a court of law, or before a board of physicians and surgeons (who use "mortal sense"), or before any man or set of men whatever, no matter whether friendly or antagonistic, because knowing that such ordeals and severer than these, all other hypotheses and theories known to science have had to pass through before they could gain acceptance; knowing also that if this system contains, as it is believed to do, the most important knowledge in the world, and is to gain the widest notice and favor, it must confront and overcome every objection, every obstacle;—if it did all these things,

it might claim our respect; but it is obvious that it has never done any thing of the kind, nor, apparently, does it ever intend to. To even suggest any such proofs meets with an indignant repulse.

If now we inquire why it fulfils none of these common requirements of research—why it scornfully rejects their proposal even,—we shall find that it is not through any lack of confidence on the part of Mrs. Eddy's followers in the verity of what is claimed, but entirely because it is precisely not what they think it is—not a science at all,—but a fanaticism built wholly on belief and feeling, or consciousness,—on such a postulate as this: "Current mortal thought is unaware that the spiritual is the only truly natural, and that the natural, so-called, can only be understood through the lens of spiritual perception." And they quote: "To undertake to account for spiritual by the logic of material phenomena, is an infinitely greater paradox than to express a mother's ecstasy in algebraic terms, or to analyze grief by the chemistry of a tear." All which is to say that we are dealing with a "science" which is demonstrable only through the emotions.

Mrs. Eddy when recounting an early cure in her own case said, that she "felt a soft glow of ineffable joy. The fever was gone, and I rose and dressed myself, in a normal condition of health. Mother was glad. The physician marveled." And again later, at the time of that cure which she dwells on as ushering in her "conviction of the principle of divine healing," she speaks of "an illumination," "a ministration," and that she felt that a miracle had been performed. This is the phraseology of ecstasy.

To work out the details of the revelation, or discovery, which was made in such a singular way—"the discovery that all causation was mind, and every effect a mental phenomenon,—she retired from the world and devoted three years to prayer and study of the Scriptures, and on

returning announced a "Science of Divine Metaphysical Healing." The shorter name by which it is known now must not be taken to be an afterthought—remembering Mr. McCracken's assertion regarding its divine impartation,—but it may be permissible to conceive that it would have been too precipitous, no doubt, to have had both subject and name revealed all at once. The world may have been expectant and waiting for the revelation—as has been broadly intimated,—but it was not prepared to receive so much illumination in a single flash; it was better that it should come in intermittant gleams—progressively as it were.

And this "Discovery," which her healers make theirs by pursuing a course of study (?) extending over "a period not less than *two weeks,*" a course which, by the way costs them three hundred dollars—"the demand made under Truth's guidance by the Teacher"—Mrs. Eddy calmly asserts, enables them to understand "mental anatomy" (Shades of Descartes and Locke!), and deal with the "real cause of disease"—as we have seen, to correctly diagnose and cure "internal decay," atheism, broken bones, consumption and cancer. Three years at devotions on her part, and two weeks study of what she discovered through her devotions, on the part of her healers, and all the learning of the ages concerning the human system has become obsolete! And there is a large body of men and women, holding themselves to be intelligent as well as sincere, who call this conglomeration of mysticism, illusion and fanaticism a science!

But is it all a fraud and a delusion? If we are obliged to answer, Yes, we may yet need to qualify, by admitting that the fraud is probably largely unconscious, and the intention good — not forgetting, however, what has been said about the pavement of Hades;—but when we consider the consequences to helpless children and the aged

of resorting to a course which is no advance over shrine cure and relic cure, denying them the benefits of a skill which alleviates suffering and prolongs life, such qualifications have no saving grace. A fraud which leads to disastrous consequences becomes no more lovely because well-meant, nor does the fact that it was perpetuated in the name of religion and science, or was unconscious of being a fraud, mitigate those consequences. Some of the greatest afflictions which men ever suffered have been due to benevolent ignorance.

"They that be whole need not a physician, *but they that are sick.*"—Matthew ix, 12.

"And I took the little book out of the angel's hand and ate it up; and it was in mouth sweet as honey, but as soon as I had eaten it, my belly was bitter."—Revelations x, 10.

HENRY WHITE.

THE EVOLUTION OF CHRISTIAN SCIENCE.

WHEN the most energetic of the Apostles declared that the new religion with which he had cast in his lot was "unto the Jews a stumbling-block, and unto the Greeks foolishness," he did, after all, but declare in other words that it was a new religion. Every new-born faith that has enough promise to make it worth noticing at all, is a stumbling-block to those who hold fast to the old. All faiths are alike foolish to those who have none. Only to them that are saved does any faith become the power of God.

One need, however, drop down no more than a few generations of the early Church to find a time when Christianity, though it still remained a stumbling-block to the Jews, had ceased to be foolishness to the Greeks. But it was not the Greeks who had changed. The new religion, having reached years of discretion, had put away childish things, and to the wisdom which is from above, had added the wisdom of this world. The problem of the first Christian centuries, if we may trust the historians, was not only to convert the world, but at the same time to rationalize the faith.

One sees the same process in almost any successful religion—indeed in almost any spiritual movement of any sort. The race of prophets from Amos to Emerson—or, if one pleases, to Shaw—has tended to see more widely than clearly. To borrow a phrase from the makers of

optical instruments, their illumination has been superior to their definition. The prophet not only sees the truth, he is seized by it. In consequence he is too apt to utter his words in a tongue, and leave it for other men to interpret them. Hence the Talmuds and the glosses, the commentaries and the criticisms, the Platonizing Fathers and the Browning Clubs. The business of them all is to set forth what the prophet would have said if he had been—as he rarely is—the servant and spokesman of the Almighty, and at the same time, an ordinary commonplace individual, moderately familiar with the learning of the Egyptians. The treasures of the soul are in earthen vessels: it is the business of the two and seventy warring sects to make out which is which.

Considerations such as these apply with especial force to the new sect whose rise and progress is in all respects the most interesting, as it is the most significant, religious movement of the day. I mean, of course, Christian Science. Doubtless we are, as the Apostle remarked to the Athenians, somewhat too religious. There are several minor Christian denominations which, to the outsider, present no very convincing reason for their existence. There are several proprietary religions which seem, fortunately, destined not to survive their inventors. Besides all these there is Mormonism.

From these, however, Christian Science is obviously marked off. In the numbers, the wealth, the social status, the intelligence, and the morality of its adherents, it is not inferior to the older Protestant bodies. There is no question of personal magnetism, since a small portion only of the members of the sect have so much as laid eyes on the founder, while the practical management of affairs is almost altogether in other hands than hers. There is no social, political, or industrial machinery such as makes the strength of Mormonism; nor are there social and political

ideals, such as for many men make a religion of socialism. In fact, at the present time in this country there is no body of believers concerned so exclusively with their own personal religion as are the adherents of Christian Science. Indeed this very absorption in religion to the exclusion of more fashionable interests, is one of the stock objections which hostile critics of Christian Science urge against it. There is, however, no occasion to enlarge on these obvious facts. Judged by the great American test of success, the religious body that, after putting two millions of dollars into a single church building, is compelled to issue appeals to its members not to give any more money, the body which finds its financial problem not to raise funds but to check the flow of supererogatory gifts, the body, I say, which can do this, shows itself able to provide "a gospel for an age of doubt."

Now the strength of Christian Science appears to lie in two different elements. The least important is that it conforms to the current monistic fashion in philosophy, and is based on that system of opinion which, when all is said, has the best standing in the schools. Even its somewhat crude idealism is better than the equally crude realism of its rivals. This, however, is a rather small matter. The real reason why at the present moment Christian Science is spreading by leaps and bounds is that, all theory aside, it does make men and women happy. Its one clear call is that

> "The mind is its own place
> And of itself can make a Heaven of Hell, a Hell of Heaven."

The simple-minded believer who has heeded this call and found heaven, needs of course no further proof. Not for him the rationalizing process, the adjustment of his living faith to science and philosophy. The twice-born,

finds himself a new creature, is quite content to take the map of his new earth on faith.

In this, one need not say, the Christian Scientist is precisely on a par with other believers. The good Catholic is not troubled by certain unsavory chapters in the history of the papacy. The good Protestant is not troubled by the New Testament devils, nor by the millennium which did not arrive before one generation had passed. To neither has it occurred that there is any problem.

Nevertheless there are always doubting Thomases, who walk in part by sight. For these there are the pious historians to explain away one class of troublesome facts, and the experts in Biblical exegesis to attend to the other. There are half-a-dozen different systems for proving that the first chapter of Genesis is in so exact accord with the teachings of geology that this fact, in itself, affords a powerful argument for the inspiration of the Scriptures. Each time a new geological doctrine has supplanted an old, a new exegesis has reconciled the two. Who can doubt that, if this new Planetesimal Theory shall become orthodox science and all our ideas of the early states of our earth become precisely reversed, the first chapter of Genesis will display a miraculous coincidence with these also?

Christian Science, therefore, differs from most other forms of religion only in being younger. It is not inherently less reasonable than they. It simply has not yet been rationalized. There are, of course, passages in Mrs. Eddy's writings that need to be spiritually discerned to make them agree with certain others. But think of the amount of learning and piety that has gone into making the Fourth Gospel line up with the Synoptics! There are passages in *Science and Health with Key to the Scriptures* which, I suppose, do not strike the carnal mind as especially edifying. Is there any thing more impossible than the Song of Songs would be without the figurative interpreta-

tion of the chapter headings? Every great religious teacher has grasped some one great truth—the unity of God, the sonship of man, the order of the moral life, the mystery of pain, the supremacy of the mind over the body. The prophet is a prophet because on this one point he has made himself understood. In addition, he has usually said a good deal more that he might better have expressed differently. All sacred writings require a certain amount of conscious or unconscious editing. It is only because the formulas of Christian Science have not yet undergone this purging, that they are so easy a mark for the unsympathetic and irreligious critic. Wait until Christian Science has developed its exegesis and its apologetics, wait until it has collated its divergent texts and suppressed all but the least troublesome. The system will be no truer, to be sure, but it will be less vulnerable.

Nor is the case in any wise different if one looks upon Christian Science, not as a religion, but as a system of medicine, and compares it with other medical cults, say for example, homeopathy. The tenets of the original homeopathists are, on their face, quite as absurd as anything between the covers of *Science and Health*. Its early practitioners were just as innocent of any knowledge of the organism they purposed to treat as any Christian Science healer. If Christian Science "has added a new terror to matrimony," so in its day did homeopathy.

Behold now the change. The homeopathic medical schools are not conspicuously inferior to others, nor the homeopathic practitioner obviously less well trained or able than his somewhat pharisaical rival of the regular school. The vagaries of Dr. Samuel Hahnemann have been explained away or forgotten until all that remains visible to the layman of his system is a certain mild prejudice against heavy doses. History has only to repeat itself, to give us by the end of the century, the "scientist" and

the regular practitioner in alliance demanding more laws for the suppression of the next great medical heresy.

Christian Science, then, like any other vigorous religion with a future before it, is bound sooner or later to go through a rationalizing process. The point that I wish especially to emphasize is that this inevitable process has already begun. If any one wishes to see for himself how a local cult works itself clear of its limitations and becomes a world-religion, here is his chance. The body of doctrine which from the first has been, in a general way, Christian, is now apparently on the point of becoming, in a sense, scientific.

Even the casual reader of Christian Science literature can hardly fail to note the occasional scientific note among the chorus of halleluiahs. Along with a great deal that is best read with the eye of faith, goes not a little carnal logic quite within the understanding of the natural man. One sees this especially in the apologetic and controversial writings of such men as Judge Hanna, Mr. Edward A. Kimball, Judge Smith, Rev. Arthur Vosburgh, Mr. Alfred Farlow—men whose mental operations are quite the reverse of those which general opinion assumes in followers of Mrs. Eddy. More than one hostile critic who has attacked carelessly, thinking that he had to do with the vaporings "of an old woman in New Hampshire, who ought long ago to have been in jail for obtaining money under false pretences," has had occasion to sympathize with the historic parrot that talked too much.

It must not be forgotten that Christian Science is fundamentally a religion: not a system of therapeutics. It is, in fact, quite conceivable that it may, in the course of time, lay aside its claims to heal the body: the Christian Church has for various reasons given over its casting out of devils and its laying on of hands. Possibly this same rationalizing process which we are considering, tends to suppress

the primitive miraculous gift. Nevertheless, since Christian Science does, obviously and as a matter of fact, heal the sick, its theory of its own healing power and its limitations is a convenient measure of the extent to which, even in the founder's lifetime, a conscious taking thought has begun to supplement the open vision.

How far this inevitable rationalization has already gone was demonstrated strikingly, almost dramatically, during the convention of Christian Scientists at Boston in June, 1906. On the day following the dedication of the great temple, one of the large sight-seeing automobiles, with useless brakes and stripped gears, ran violently down a steep place, dropped over a ten-foot embankment, and piled into a pitiable heap some thirty or more unfortunate delegates. Luckily no one happened to be killed, but there was the usual array of broken ribs and twisted limbs. All observers unite in testifying to the cheerful courage of the sufferers—women too badly hurt to move lay on the ground in the rain and joined in the hymns of their faith. The next day, most of the victims were attending meetings as if nothing had happened. There was a striking absence of suffering from nervous shock.

The noteworthy point is, however, that while all the injured made light of their hurts, for the most part they accepted surgical aid. Since, therefore, those persons, from the fact that they were at the convention at all, are presumably at least representative disciples of Mrs. Eddy, it is evident that their behavior lies within the limits of orthodoxy. Shortly afterward, the leaders of the convention, taunted with their departure from the faith lately delivered to the saints, explained officially that Christian Science not only allows but encourages surgical aid.

The surgeon, they pointed out in effect, merely puts back the displaced bone; a very different agent makes it whole. Disordered bodily processes are "errors of mortal

mind"; mechanical injuries are not. A consistent Christian Scientist will no more refuse the help of the medical man in altering the position of one of his bones, than he will decline the aid of the trolley car in altering the position of them all. In short, to state the "Scientist's" case in words very different from his own, an art which has to do with the location of objects in space, cannot be in conflict with a faith which has to do with ideas in the mind.

Moreover, it is (or should be) well known that the faithful are now enjoined not to treat any contagious disease, but on the contrary to conform heartily to the regulations of boards of health. While still maintaining his theory of disease and his rights as an individual, the Christian Scientist finds that practically there are certain errors that are peculiarly liable to spread to other mortal minds; and as a good citizen, he will take all reasonable precaution against upsetting the mental balance of his neighbor.

The distinction between sickness and injury, and between contagious and non-contagious diseases, is from the standpoint of Christian Science, a perfectly valid and reasonable one. It is obviously, too, a distinction of profound importance to the development of Christian Science theology. Yet the matter is treated almost as lightly in Mrs. Eddy's writings as is the doctrine of the Trinity in the New Testament. Both doctrines are aspects of that rationalizing process which every persistent religion has to undergo. Both rest on induced rather than primary meanings of the sacred text.

Take by way of one more illustration of the same tendency, Mrs. Eddy's familiar doctrine that the effects of remedies and poisons are due solely to the belief of the people who take them. Stated crudely, it is distinctly a hard saying. Subjected to the exegesis of the more academically-minded believers, it takes on a different aspect. As all idealists, from Bishop Berkeley to Mrs. Eddy, agree,

the entire material universe and all the properties of matter as we know it, are unthinkable without the perceiving mind. But the chemical properties of such bodies as are mentioned in the Pharmacopœa are also dependent on a perceiving mind. If, therefore, the Absolute Thinker who thinks the universe, and the mortal thinkers that use human brains, united in thinking that sulphuric acid is a pleasant and wholesome beverage, and in addition, *thought out all the rest of the universe consistently with this idea*, then would sulphuric acid cease to corrode human flesh. In short, the newly discovered drug is poison or medicine, not because the patient thinks it so, or because the doctor thinks it so, but because all thinkers great and small, and the Universal Thinker as well, are constrained, in this detail, to think consistently with all else which they have thought since the foundation of the world. The position is one that no Idealist can gainsay. Once admit the validity of the method of proof-texts, and it becomes a legitimate interpretation of Mrs. Eddy's language. If the exegesis seems a trifle forced in places, let us not forget the "days" of Genesis, and the "creeping things" which, in a single passage only, are the larger carnivora.

The rationalizing process once under way, the result is reasonably obvious. If one may set a broken bone, he may extirpate a cancer. If he may kill a savage dog with a gun, he may kill a bacterium with an antiseptic. Half the fine-spun logic that has gone to straightening out sundry other faiths, will make *Science and Health* read like a geometry. It is a poor sort of sacred book from which cannot be taken out far more truth than its maker ever put in.

When, therefore, the inevitable rationalization of Christian Science shall have done its work, when its vagaries like those of all young religions, shall have gone the way of the communism and the millennianism of the

early Church, of Luther's belief in devils, Wesley's fear of witchcraft, the indecent antics of the New England Quakers, there will remain two worthy achievements. Christian Science will still be the single religion, available for the Western world, to stand upon a thoroughgoing and uncompromising idealism. It will be in addition, the first modern attempt to make on a large scale practical application of religion to the palliation or cure of some of the most distressing ills of this mortal life.

For there can be no doubt that, for the most part, the cures of Christian Science are real cures. Aside from all questions of the fallibility of inexpert testimony and amateur diagnosis, the fact remains that the man in the street does know when he is sick and does know when he is well again. Beyond this, however, lies the still more significant fact that already for several years a small group of competent and reputable medical men have been curing the same kind of diseases by essentially the same methods.

I need not say that I refer to the practical results obtained by such men as Bernheim, Charcot, Braid, Janet, Wetterstrand, Bramwell, Tuckey, van Renterghem, Prince, Sidis, all physicians as well as men of science, who report yearly the cure of hundreds of cases by means of hypnotic suggestion alone. Now suggestion is suggestion whether given by some ignorant healer or by some professor of experimental psychology with an international reputation. The one talks vaguely of the errors of the mortal mind; the other talks learnedly of persistent subconscious ideas. They evidently mean pretty much the same thing. Both alike, and in not very unequal measure, put an end to ills that do not yield to more usual methods.

The literature of Christian Science teems with cases of which the following are typical. A man going to the dentist to have five teeth extracted, is told that he will feel no pain whatever. The prediction is so far borne out that

even when the operator, by way of experiment, turns a tooth round and round in its socket before drawing it, the patient feels no distress and laughs as he spits out the blood. A middle-aged woman suffers so much from eczema that she cannot sleep and after four years of orthodox treatment and one surgical operation, gives up medical help and becomes steadily worse. The idea is impressed on her that the disease exists only in her mind and that as soon as she expells the delusion she will be well again. Immediately all irritation vanishes. In a fortnight she is completely cured, and three years later there has been no relapse. A boy of sixteen receives a blow on the knee, and as a result, the joint becomes so swollen, painful and stiff that a month later the limb remains partly flexed and can neither be bent further nor straightened. The "error" needs to be "demonstrated" but once before the boy can walk without limping, and the swelling has departed.

Cases of this sort, I say, are to be had by the hundred in the literature of Christian Science. These three, however, happen to be from other sources. The first is one of Dr. Bernheim's from his *Suggestive Therapeutics,* the second Dr. Bramwell's from his address before the British Medical Association in July of 1898, the third is Dr. Wetterstrand's from his *Hypnotism and Its Relation to Practical Medicine.* One could cite such by the hundred. Neither the medical man nor the Christian Scientist can in these matters give odds to the other. Sauce for the goose is sauce for the gander. The only obvious difference is that the medical men, before casting out the errors of mortal mind, are obliged, usually, to hypnotize their patients, whereas their rivals are not.

Yet even this unimportant distinction breaks down with Dr. Boris Sidis's discovery of the hypnoidal state in which the patient, while highly suggestible for his own good, is reasonably alert, entire master of himself, and in no wise

under the control of the operator. Thus with the progress of medical science, its methods tend to assimilate themselves to those of Christian Science.

Since, therefore, successful and reputable physicians, ever since the days of Mesmer, have systematically and purposely made use of suggestion, it is the least rational of all objections to Christian Science that it works its cures only by acting on the "imagination." Of course it cures by acting on the imagination. It has never for a moment claimed to do anything else. That aspect of the self which the man in the street calls hazily "the imagination," Mrs. Eddy with hardly more clarity terms "mortal mind." Both are obviously vague terms for the subconsciousness, the subliminal self, of the experimental psychologists. "If I by Beelzebub cast out devils," the Christian Scientist may justly answer the physician, "by whom do your sons cast them out?"

Nor is there much more sense in that other stock argument against Christian Science—that it goes on all fours with osteopathy, mental healing, faith cure, the original and unrationalized homeopathy, blue glass, herb doctors, vegetable compounds, natural bone setters, and all the rest of the great host of quacks and quackeries that afflict mankind. In a sense this is, of course, obviously true. All quackeries are in part, devices for influencing the bodily processes by way of the subconscious mind. But surely, the last reason for distrusting any system of medicine, or any system of anything else, is that it works even in dishonest or incompetent hands.

Yet after all, Christian Science is a religion with its theology, its worship, its temples, its sacred book. Its cures are but an incident in a larger work. The physician may cure by suggestion and remain a man of science. The Christian Scientist may cure by suggestion and remain a teacher of religion. If a man is to be made whole by means

of psycho-therapeutics, it may be a matter of doubt whether science or quackery or religion will be the most efficient. There cannot be any doubt which, on the long run, is likely to be the most wholesome. It is good even to be duped into health. It is good also to be hypnotized into it. But it is still better to be converted.

There is also another strange delusion concerning the cures of Christian Science—the idea that because its special field is the group of functional, nervous, "imaginary" disorders, it is therefore of no special consequence. To begin with, it is not true as a matter of fact that suggestion is valuable only in functional diseases. The regular medical practitioners who employ the methods of psycho-therapeutics, do actually find them to be, in some measure, efficacious in organic diseases as well. Aside from this, however, whence comes the idea that an "imaginary" disease is a small matter? If one were to choose between being hit by an express train and having his legs broken, and being missed and having his legs paralysed by a nervous shock, he would far better take the hit. The broken bones would be whole in a few weeks. The "imaginary" trouble might easily cripple him for life—unless he were lucky enough to consult some expert in morbid psychology, or become a convert to Christian Science. Under modern conditions, it is precisely the "imaginary" ills, the nervous dyspepsias, hysterias, paralyses, dipsomanias, neurasthenias, neuralgias, auto-intoxications, insomnias, that are most fatal to happiness and most difficult to cure.

I suggest, then, the square deal. Of course, nothing is easier than to make fun of Christian Science. But then nothing is easier than to make fun of any religion that one does not happen to believe. The late Robert Ingersoll made a very comfortable addition to his yearly income by ridiculing Christianity and showing up its inconsistencies and absurdities. What religion is there that has escaped

the merry jibes of the skeptic—or to be candid, has failed to deserve them. Ultimately, absolutely, it is no more ridiculous for a man to sit in a stuffed chair and administer absent treatment to a sick cow, than for a man to fall on his knees on a stone floor and cry aloud to a brazen sky. Both have provoked laughter.

But so far as religions are foolish at all, a new religion is bound, in the nature of things, to be twice as foolish as an old one. Christianity, we all recognize, is in part the product of the "Christian consciousness." Mohammedanism, in like manner, has been worked over and rationalized by the Mohammedan consciousness. But Christian Science has thus far shown only the first beginnings of a Christian Science consciousness. It does make men happy. It does make men whole. It does not yet make them theologians. Any system of opinions ought to be acceptable according as it hath, not according as it hath not. More than the traditional forty religions are saying, "Thy sins be forgiven thee!" As many systems of medicine are saying, "Rise up and walk!" What other than Christian Science is saying both?

E. T. Brewster.

Andover, Mass.

CHRISTIAN SCIENCE AND THE REASON OF ITS STRENGTH.

WE do not hesitate to accept the theory of de Lametrie as summed up in the title of his little book *L'homme une machine,* only we insist on the truism that all living organisms, even plants, are alive and therefore *living* machines, and further that animals are both *living* and *sentient* machines, which implies that, though sentiments and thoughts considered as such are not motions, the physiological process which takes place in nervous substance while man feels and thinks is purely mechanical. We purposely do not say that thought is motion, but that the physiological process of thinking is as mechanical a process as is an electric shock, or a chemical combination, or the movement of a machine. Brain-action is a most complicated process involving chemical changes and electrical tensions, but with all its wonderful and untraceable minuteness of detail in molecular mechanics it is as physical a phenomenon as the fall of a stone or the motion of a lever and the turn of a crank.

Without entering into a discussion of the basic conceptions of psychology, we will only point out some important conclusions establishing what is popularly called "the power of mind over matter," which can be directly derived from the principles of this most radical and, in scientific circles, largely accepted theory. A due appreciation of the oneness of thought and physical brain action will throw

more light even upon those mental phenomena that have often puzzled thoughtful observers, than do mystical and spiritualistic theories.

The character of a man is a very important factor of his life. Indeed we are justified in calling it the most important one. It is even more important than the question whether or not an engine is well oiled. Two machines may be of exactly the same construction, but if one is not properly lubricated, it will refuse to work. In the same way a man who is dejected in spirit, and of a gloomy and pessimistic disposition will naturally prove a failure, while some other day if he be buoyant and in high spirits he will without difficulty be successful in the same kind of enterprise. Just as an engineer must keep his machine well oiled so must we keep our minds well disposed and thus overcome the jarring friction of ill-temper.

It is remarkable to what an extent the disposition of a man enters as a factor in his daily life. It may make or mar his destiny, and if anything lies within our own power to regulate, it is our attitude toward the world.

Kant tells us that he suffered greatly from *angina pectoris*, and we know that patients of this type are subject to nightmares and many psychical depressions which sometimes render them unfit for transacting business and prove a great hindrance to their mental and bodily development. Kant acquired a thorough medical insight into his condition, and, simply by a calm consideration of the physical character of his disorder, mastered it to such an extent as to conquer it almost entirely. He reached an advanced age and suffered very little during attacks because he prepared himself to receive them with a calmness that made them pass by without disturbing his mental equilibrium or doing any other incidental harm.

But the influence of mind over matter goes further still. A belief in ghosts will conjure up ghosts, and these

specters are as real to the visionary as dream apparitions are to the man in ordinary normal sleep. We must only consider how sense-impressions originate, and bear in mind their subjective nature. A hallucination, though purely subjective, is frequently as concrete and definite as the sensation of a real objective thing, and it is true, as Shakespeare says, that we are such stuff as dreams are made on. The unsophisticated man believes that he sees an external object, but the thing that appears to him outside of himself is in fact a sensation on his retina. If memory traces of former sensations registered somewhere in the nervous substance of the brain are stimulated, they are revived and if the process is sufficiently strong they will be almost as vivid as the sensation of the original impression. This should ordinarily happen in dreams only, but it also occurs in the waking state of consciousness, quite frequently among primitive people, while in civilized society it is rare and mostly limited to a few abnormal minds, where it may or may not be a symptom of disease. The poet's imagination is sometimes so vivid as to make him actually see the visions of his mind to which he gives utterance in verse, and the inventor similarly visualizes the combinations of his devices. Men of a critical disposition and trained in the art of self-observation will analyze the form of any apparition that may come to them and the specter will dissolve before their eyes under the wholesome influence of a calm contemplation.

Goethe tells us in his "Erlking" the tragic story of a child who died of fright, and Bürger in his "Leonore" relates the feverish hallucination of a maiden whose lover did not return from the field of battle. In these cases the cerebral agitation of an excited mind affects the whole body and leads to a tragic end. To the same category belongs the story of the death of a court jester who for some bad joke had been condemned to death, but secretly

pardoned. His master, a German duke, had ordered the executioner to use a long sausage instead of a sword, but when the stroke came, the poor fool expecting to die, fell dead.

A striking instance of the power of faith is the story of the holy lance of Antioch which saved the army of the crusaders from perdition, and it is important for our purpose that the details of this most interesting and instructive event are historically well established and even the legendary accretions can be traced to their origin, since many accounts were written down immediately after the marvelous delivery of the Christians.

The crusaders, divided according to nationality (among which the Normans under Boemund and the Provençals under Raimond were the main constituents) laid siege to Antioch in May 1098, but Kerbogha of Mosul approached with a large army which, according to some reports was not less than 300,000, and according to others even more than 600,000. It was a well equipped and formidable army which by numbers alone threatend to crush the bold invaders. Before the Moslem forces reached the field of action Boemund succeeded through the help of a traitor to take possession of Antioch (June 2) but the situation soon became more precarious. Kerbogha cut off the supply of food and water so as to reduce the Christians to a miserable plight, and many of them, even some of the leaders, such as Count Stephen of Blois and for a time even Peter of Amiens, deserted in despair; some surrendered to the Saracens and became Moslems, while others tried to make their escape, most of them perishing in the attempt. The starving crusaders in their dire emergency were compelled to eat the most incredible things if they could but be chewed and swallowed; grass, the bark of trees, shoe leather, and the half-decayed carcasses of dead animals were deemed a luxury. At the same time Kerbogha

harassed the weakened soldiers by constant attacks and tired them out through the necessity of being constantly on the alert to repel the enemy. Rarely has an army seen more distress than did the crusaders in those days. They became lamentably demoralized and their final destruction according to all human calculation seemed to be merely a question of days.

At this point Peter Bartholomew, a man of low birth, came to Count Raimond and announced that St. Andrew had appeared to him in a vision and had shown him the holy lance with which Christ had been pierced at the crucifixion, and informed him that it lay deeply buried in the church of St. Peter at Antioch. If the crusaders would but come into its possession they would soon be delivered from all their trouble. Count Raimond and most of his Provençals gave heed at once to Peter Bartholomew's message, while Boemund and his Normans smiled at their credulity. Twelve men dug in the church for a whole day until night time. They had almost despaired of finding anything when at an advanced hour of the night a lance was actually discovered. And now the joy of the crusaders knew no limit. Many doubters became converted and the hope for a final victory revived at a marvelous rate. Boemund and his more critical friends did not oppose this powerful wave of fanaticism, because it accomplished as if by a miracle what they had long tried in vain to do. The spirit of the whole army was changed, for a bold confidence in their cause had replaced their former pusillanimity.

By general consent Boemund now took command of the whole army. The other princes recognizing his higher ability voluntarily surrendered to him their authority. He restored order among the demoralized troops and with great circumspection prepared an attack on the enemy whose numbers were several times their own. The crusaders had to leave behind almost half of their own army to de-

fend the fortifications of Antioch, while the Saracens could lead their entire forces into battle. In spite of these enormous odds the Christian army was ensouled with a faith in the miraculous power of the holy lance which was carried in front of their army, and this fanaticism which fortunately was combined with the calm judgment of Boemund, inspired the Christians with almost superhuman strength and made their onslaught irresistible. The battle was fought out to a finish and Kerbogha's army was annihilated on June 28th. The Moslem camp with its rich supplies and great treasures was taken and Antioch with the surrounding country became the undisputed possession of the victorious Christians.

Boemund had always doubted the genuineness of the lance, and he finally succeeded in proving his contention. He kept silent so long as he saw that this grand faith cure restored the sinking courage of the Christians, and in this instance the miracle was accomplished although the lance was an imposition and its discovery a farce.

Similar triumphs of preconceived ideas in which the power of thought, whether wrong or right, true or false, plays an important part, happen frequently,—we have only to refer to the case of the Maid of Orleans; but events are rare in which we can trace success so clearly to the enthusiasm of a superstition as in the case of the holy lance of Antioch.

It is remarkable that a similar confidence in success seems to extend also to animals, to machines, and even to the most lifeless objects. They seem to be better fitted for their purpose and we can not doubt that the way they are handled frequently makes them more serviceable in critical moments.

Superstition alone is apt to lead to failure, but when fanaticism is coupled with a levelheaded circumspection it can surmount the greatest difficulties and accomplish,

not exactly the impossible, yet assuredly incredibly great things. The Roundheads were strong through prayer, but Cromwell used to remind them of the necessity of keeping their powder dry.

All instances of faith-cure, the healing by prayer, mesmerism, etc., also the miraculous cures in the cemetery of Père La Chaise at Paris, mentioned by Hume, belong to this class and prove the influence of mind upon the domain of physical nature. If we remember that mind is the subjective aspect of physiological processes, and if we understand the full significance of this close interrelation of matter and mind in all its consequences, we can not only judge how these apparent miracles are possible, but will also know their limitations. To the naive believer the experience of one flagrant success is such an evidence of the unlimited power of faith that he will fondly imagine that there is no end to the possibilities of faith and that failures are always due to unbelief. Says Jesus:* "Verily I say unto you, If ye have faith as a grain of mustard seed, ye shall say unto this mountain, Remove hence to yonder place; and it shall remove; and nothing shall be impossible unto you."

We cannot doubt that Christianity in its primitive forms actually cherished the hope of being able to cure by faith, although this feature was not made prominent by St. Paul, nor was it encouraged by the organizers of the Church, but an adherent of this idea inserted into the canon this parting word of the resurrected Jesus to his disciples (Mark xvi. 17, 18): "And these signs shall follow them that believe; In my name shall they cast out devils; they shall speak with new tongues; They shall take up serpents; and if they drink any deadly thing, it shall not hurt them; they shall lay hands on the sick, and they shall recover."

* Matt. xvii. 20.

Here miracles are positively made the signs of discipleship, and we can not doubt that among the early Christians many events happened and many things were believed which aroused in them the confidence that miracles were possible indeed.

The truth is that there is actually a power of mind over body, and this power seems almost incredible in its varied applications and marvelous results. But we would say that from a monistic standpoint they are simply what ought to be expected, and many unusual successes are attainable without a belief in miracles solely by self-control and self-discipline. People of a deficient education and without strength of will are frequently helped by fanaticism and superstition; they can be so electrified by a thrilling error as to accomplish things greater than they know or comprehend. They become, as it were, the instrument of a mystic idea which seizes them and carries them away they know not whither; and so they are naturally bewildered by the spiritual storm that with a happy blast carries their soul into a haven of safety.

It is apparent that many phenomena of faith-cure, Christian Science, mental healing and their ilk are as well established as they are old and well known to historians. The Christian Science movement is the revival of a belief based upon certain experiences and to some extent justified by remarkable events that have happened again and again under all zones and in all ages. Such beliefs crop out spontaneously whenever they are needed and will disappear again when they have done their work. Sane men will naturally employ the good that is in Christian Science and faith-cure. In fact they have done so long ago and all the time. To them the gospel of Christian Science is nothing new. But to those who lack the self-discipline which ought to be a part of an all-around education, it will come as a remarkable help in many difficult situations and will,

if it but be kept within fair limits, contribute to their spiritual as well as bodily welfare.

It stands to reason that the errors of the movement will soon be remedied by experience, though in some cases it may have to be bought dearly. In the meantime, however, it will make its devotees cheerful when others would fain break down in the tribulations of life and will give them strength sometimes under extraordinary difficulties.

The significance of self-discipline and the power of mind has been unduly neglected by educators, physicians and other guides and advisers of mankind. To be sure Christian Science has its very weak points, but it would not exist had it not a mission to fulfil.

EDITOR.

NEW PRINCIPLES IN AGRICULTURAL PLANT-BREEDING.

THE theory of mutation is directly opposed to the current view of an origin of species and races by means of slow and gradual changes. It assumes a saltatory transformation of one form into another, or rather, since the parent form does not disappear in the process, it claims the production of new forms by lateral saults from the main stem. In this way the same species may produce quite a number of new types, either simultaneously or at short or long intervals.

This new principle finds its application in nature as well as in agricultural and horticultural practice. It is now rapidly gaining acknowledgment among biologists, but many plant-breeders still keep to the old view. They prefer a slow amelioration of their races to the more rapid improvement, of which the theory of mutation points out the possibility. Their vast experience supports their view, at least apparently, and until some time ago, no direct facts could be adduced to give proof of its inaccuracy. It is always venturesome to oppose a scientific theory to practical experience, and such a process can only be successful if it is possible to give a full and evident explanation of the facts on which that experience was based.

In the case of plant-breeding, however, new discoveries concerning the variability of cereals and other crops have been made of late. Dr. Nilsson, the director of the Agri-

cultural Experiment Station at Svalöf, Sweden, has found that this variability wholly complies with the views propounded by the theory of mutation and does not support the conception of slow changes as a means of improving agricultural races. During the last fifteen years he has produced quite a number of new and valuable races which have already supplanted the old types on numerous farms of Sweden, and which are now being introduced into Germany and other European countries, on a large scale. All his races have been produced by a single choice for each; after that they proved constant at once and had only to be multiplied and to be compared with the existing forms.

Theory and practice thus being in perfect harmony, it appears desirable to submit the opposed views to a sharp criticism. The question naturally arises, in how far the processes now generally in use may be modified advantageously by the introduction of the new principle. It is evident that the reduction of the selection, which now embraces a series of years, to one single choice, must simplify and shorten the work, and that on this account, the new ideas have a distinct claim to consideration.

The current view assumes that varieties of plants can be changed artificially in such ways as the breeder may choose. It is claimed that existing characters can be modified, and that new qualities can be forced upon the plants. Environmental influences and selection are the means employed. From six to ten generations are said to be generally sufficient to fix the descendants of the originally chosen individuals in their new ways. This lapse of time is required to prevent the new varieties from reverting to the former condition. When once stability is secured, the variety may be counted upon to keep true to its new qualities.

This conception originated at a time when the different types of variability were still unknown. It combines facts

belonging to contrasting phenomena into one single process, and therefore must seem inviolable only as long as it is not possible to make that distinction. Modern science, however, has shown that variability embraces two main subdivisions, which follow quite different laws. One of them is now called fluctuating variability, or fluctuability, and the other mutability. Fluctuations are the slow and gradual changes, which are always present in every cultivated race or wild species. They are affording a rich material for selection and improvement, but do not lead to constant varieties. Their main example is the improvement of sugar-beets. Mutations, on the other hand, are saltatory changes, which at once give birth to new and constant forms. These, if kept free from the contamination by pollen of the parent species, do not revert to it, and do not need any further selection. Usually, they are even so uniform, that they do not afford the material for such selection. Fluctuations never fail, and any large set of seedlings of a common origin will show them. But mutations are rare, and, as a rule, occur only from time to time. Their products, however, will multiply and keep their standing during successive generations, at least wherever the new characters are of a useful or harmless nature. In this way the number of mutated types within a given species or variety may increase in the lapse of time, even until the old form becomes changed into a group of more or less numerous mutative units. Numerous wild species have been recognized of late in this condition, and almost all the prominent agricultural crops comply with this rule. Varieties, as they are called, of cereals, of corn, of clover and of many other plants are seen to be multiform, each of them comprising a larger or smaller number of well-defined forms. These units, when isolated, prove uniform and constant, and afford material for selection quite different from that afforded by the fluctuating variability.

In this discussion I am not concerned with artificial hybridizations and hybrids. They are only exceptionally of prominent value in the production of such varieties as are usually propagated from seed. Natural hybridizations, on the other hand, are occurring in the fields more frequently than is generally assumed, and have a distinct influence on the practical significance of mutability. It is easy to understand this. As soon as nature has produced, in a field, a new type which is distinguished from the main sort by some distinct character, this new character can be transferred by accidental crosses on other constituents of the variety, and, in the long run, perhaps, on all of them. By this means the new quality will be combined with all of the types already existing within the variety, and a series of new forms will be produced. It is easily seen that a single mutation, by means of such crosses, may be the beginning of a number of new elementary forms, some of which may have useful and others indifferent characters. This is the process by which the present state of multiformity of most of our agricultural varieties has originated, according to the theory of mutation and according to the facts discovered at Svalöf, which now so plainly support this view.

I have cited the selection of the sugar-beets as an instance of utilizing fluctuating variability. Setting aside the initial choice of this race by Louis Vilmorin, concerning which no historical dates have been recorded, this selection is exclusively concerned with qualities which are always varying, and which, as far as they have been studied, follow the ordinary laws of fluctuating variability, first discovered by Quetelet for men, and since applied to the animal and vegetable kingdoms by Galton and others. The form and branching of the roots, the character of the foliage, and mainly the sugar-percentage, are the points which have to be improved by selection. The range of the

variability increases in a corresponding degree with the number of specimens investigated, and nowadays the selection is usually made out of some hundred thousands of individuals whose sugar-percentage has been determined by polarization. Out of these numbers some few of the very best are chosen yearly and only by means of this very sharp selection the races can be kept up to their present high standard. Discontinuing the selection would mean to allow the race to return to its former comparatively poor condition, and no intelligent farmer would sow such seeds. More than thirty generations have improved the beets, but there is not the least sign that this improvement should have led to the production of constant and independent races. The capacity of producing more sugar cannot be enforced upon the race, and the only work of the breeder is to select, in each generation, those individuals which, from the unknown influence of environmental conditions, seem to him the most apt to give a progeny which will, temporarily, yield a rich harvest of sugar.

Contrasting with this process of selecting sugar-beets is the work of the horticulturists in producing new varieties of seed-plants. As already mentioned, I am not concerned here with artificial hybridization, which, in the field of horticulture, mainly produces varieties which must be propagated in the vegetative way in order to remain constant. In vegetables and garden flowers new varieties, as a rule, arise suddenly, and historical records are at hand which give the origin for a considerable number of them. Every year the catalogues of the prominent nurseries bring some novelties. These are all produced by leaps and are, from their first appearance, isolated and subjected to the process of selection in order to "fix" them, as the phrase goes. This "fixing," however, is only a purifying from foreign admixtures, which usually are the consequence of the partial pollination of the first mutants

by their neighbors, since it is, as a rule, impossible, or at least hazardous, to isolate the mutants themselves by transplanting them to a distant spot. It requires four or five or more years, according to the fertility of the species. There is no such thing as a theoretical fixing of initially unfixed characters, and whenever the isolation is performed by scientific methods, insuring complete self-fertilization, the new race is, at once, found constant and in no need of "fixing.".

In nature new species originate in the same way, at least as far as our present limited knowledge goes. I have had the privilege of cultivating in my experiment garden, a species which was then in a mutative condition. It is the large-flowered evening primrose, or evening primrose of Lamarck. It has produced about a dozen new species and is repeating the same process of mutability, now, in numerous gardens of the United States and elsewhere. The new types spring from it by leaps and laterally; they are, as a rule, constant from the very beginning, the only condition being that the flowers of the first mutant are artificially kept free from visiting insects and purely fertilized. No preparatory changes and no intermediates are observed, and the mutations are always complete, never producing half-way steps which must be repeated in order to reach the full mutation. They do not need any guidance or any help, they cannot be improved or fixed, since from their very first appearance they are a pure, new type. Moreover, they are constant from seed, never reverting to the parental type, but subjected, like this, to progressive mutations. Some of them excel the evening primrose of Lamarck by distinct qualities, others are weaker, or deficient in some point. If they had originated in a nursery and not in an experimental garden, the latter would have been thrown away and only the stout, profusely flowering

types, and perhaps the dwarfish variety, would have been selected for multiplication and introduction into trade.

The experiments at the above-named Swedish experiment station lead to the conclusion that among cereals and other large agricultural crops new types arise in the same way as in horticulture and in experimental work. Moreover, they show that the process of slow and gradual improvement of races is only an imaginary one. There is no doubt that by continued selection excellent races have been produced and can still be secured. But this, in itself, is no proof of slow improvement, as we shall soon see.

At Svalöf this method of repeated selection was followed in the beginning, because it was then the prevailing method among European breeders. It is now twenty years since the station was founded, and during the first period of its work, embracing about five years, a great number of varieties of cereals were subjected to this selection. The result has been the same which, as a fact, was the result of this kind of breeding in Germany, but which had never clearly been pointed out. Some few varieties could be improved and yielded excellent new types, of which some have since been introduced into Swedish agriculture and are now prominent races in the southern and middle parts of that country. But by far the larger number of the experiments yielded no results at all and the most striking among them were those with the Chevalier barley which, in Middle Sweden, is a fine brewers' barley, but exposed to failures during unfavorable summers on account of its slender stems. No amount of care, no endurance, no treatment and no selection were able to secure firmer stems in this barley, and since this was the improvement which the Swedish farmers desired above all, the whole method of continuous selection necessarily fell into discredit. Good results were exceptions, and therefore the principle was not one that could be relied upon. The idea suggested

itself that those exceptions might be due to wholly different and accidentally active causes and that it would be better to seek for these causes than to continue a method of such doubtful significance.

In order to discover these suspected causes, selection experiments were started anew and on a large scale. About a thousand samples were chosen in the grain fields of the station, each comprising a certain number of ears which were estimated to differ from the main type of their variety in the same valuable quality. Each sample was sowed separately and the next summer the lots could be compared with one another. It was hoped that each lot would be uniform and different from the others. Nothing of the kind, however, was seen, with only some few exceptions. All the lots were apparently as variable as the variety from which they had been chosen and only these few were really uniform. Exact records had been kept concerning the chosen samples and, especially, the number of ears had been entered for each. This excellent book-keeping led to the discovery of the fact that only those lots were really uniform on which only the kernels of one single ear had been sown. Hence the conclusion that the mixture of ears of apparently similar characters was a principal fault of the prevailing method. No similarity can be relied upon, and only the progeny can decide concerning purity and agricultural value.

As soon as this fact was discovered, it was elevated to the rank of a leading principle and tested on as large a scale as possible. Again, a thousand samples were chosen in the field, but this time each sample consisted of one ear only. The kernels of each ear were sown separately, and the next year the result surpassed the highest expectations. Instead of a hopeless multiformity, uniformity now prevailed. With some few exceptions each lot was uniform. Of course, there were fluctuating differ-

ences. But these proved to be very small, so small as not to afford any material for further selection or even to justify a desire for purification. The exceptions have since been proven to have been caused by the accidental choice of hybrid ears. Leaving these aside, the result was that the progeny of single ears is pure but that of mixed ears impure, and all subsequent experiments have absolutely justified this conclusion. In this way, by single-ear-selection, as it is called, at once numerous new races can be isolated from the ordinary variable or rather multiform varieties.

Once isolated, such single-parent races are constant from seed and remain true to their type. They can be multiplied without further selection and, therefore, very rapidly. Some five or six years are, as a rule, sufficient to produce from one chosen initial individual the whole quantity required for advantageous introduction into agriculture at large. It is, however, manifest that not all the isolated races will be real improvements. Hence it follows that they have to be compared with one another and with the existing varieties, in order to find out which among them are the very best. This work has been found to be far more difficult and time-consuming than the initial selection and is now to be considered as the chief task of the station at Svalöf and of all breeders who will work along the same lines. On the other hand, it has been proved that the variability among these isolated races is so great and goes on in so many different directions as to comply with almost all the desires of the breeders. The experiment fields of the station can be said to be an exhibit on which each farmer can find and choose exactly the varieties which will be suitable for his farm and his industrial needs. Even a stiff-halmed barley was among the first products of this new method; it is now known as Primus barley and largely grown all over the middle part of Sweden.

In this way single-ear selection and separate culture is, now, the principle of all plant-breeding at Svalöf. It is the same idea which has been applied by W. M. Hays at the State Experiment Station of Minnesota to the improvement of the local wheats, Fife and Blue Stem, of that State, and which there has given such remarkable results. But at Svalöf the works rests on so broad an experimental basis, that all the details of the method have been thoroughly cleared up, and that it may be applied to any other agricultural crop with full confidence in its success.

Moreover, it gives a very simple answer to the question as to the cause of the exceptional results secured by repeated selection. These start from samples of ears, as is the custom in Germany and elsewhere. Each ear, if sown separately, would have given a uniform progeny; mixed together they give a mixed progeny. Out of this mixture the continued selection will first eliminate some of the strains, and then gradually restrict the number, until, at last, only the progeny of one of the initially chosen ears remains. Then the race will be as pure and constant as it will be excellent. But it is evident that quite the same result could have been obtained without the repetition of the selection, if only the kernels of each initial ear had been sown separately.

Of course the principle applies to the breeding of corn as well. Here the newly introduced method of selection chooses and separates the ears, and compares their progeny after separate sowing. The principle would be exactly the same and at once yield the same uniform and constant races as at Svalöf, were it not for the wind-pollination of the species. No repeated selection would be needed in order to obtain constant races, nor would it be even possible but for the elimination of the contaminating effects of natural cross-fertilization. Hence we may conclude that the now prevailing method of continued selection has,

as a fact, nothing to do with real improvement, but has only to improve the races by purifying them from vicinistic impurities. The selection of the best ears for seed-corn is quite another question, since it does not affect the race-production, but has simply to eliminate the ears which, through fluctuating variability, least comply with the demands of the planting machine or the planter which can plant regularly only when the seeds are uniform in size and shape. It has also to eliminate the ears of insufficient vitality and of some other inferior qualities. If a method could be found to select corn-ears on the paternal side, as well as on the maternal, all repeated selection would probably be superfluous in the building of new races.

I have indulged in these suggestions only to show the wide applicability and the probably high value of the principle of one year selection without repetition. In numerous cases it will simplify and shorten the work of the breeder. But it excels the current views mainly in as much as it gives a truer and clearer conception of the variability of agricultural plants, and thus will soon become a rich source of methodical improvements in all plant-breeding.

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A SCIENTIFIC VIEW OF HUMAN CHOICE, ETC.

a. THE UNIVERSALITY OF MOTION.

THE object of this article is to show that human choice is essentially due to natural influences, and that the properties of the substances of which our bodies are composed and those of the bodies by which we are surrounded, are largely, if not wholly, the causes of our conduct; or more precisely stated, to show by means of natural facts, that the fundamental cause of human choice is the universal motion which pervades all bodies and all space, and which we are unable either to create or destroy. The universal existence of this never-ceasing motion of masses has been abundantly proved by astronomers; and the incessant motion of molecules, of which all bodies are composed, has been sufficiently shown by the experimental labors of numerous physicists, chemists, spectroscopists, etc.—the substance radium is a conspicuous example of this self-contained motion.

As the subject of human conduct is a complex one, this article requires careful reading; its great complexity is abundantly shown by the arguments used in legal trials on moral subjects. In order to arrive at the most perfect truth in any question, and especially in a complex one, we must take the widest view of it, and this can only be done by first acquiring the most comprehensive and suitable knowledge and experience respecting it. The widest view is the scientific one, the narrow is the ordinary one, and

each varies in width with the knowledge, experience, and reasoning-power of the inquirer; "what can we reason from but what we know?" It is largely in consequence of deficiency of suitable knowledge and experience that erroneous views arise. A man may be able in one part of science, and yet be unable to take a wide scientific view of the phenomena of human choice. There are all degrees of width of view of a subject, ranging from the two extremes of greatest knowledge and greatest ignorance, and our widest view is still a very incomplete one in consequence of the comparatively limited knowledge even of the most learned men. The total amount of evidence in proof of the truth of the chief principles of science is already vastly larger than the brain of any man can contain;—nevertheless, if we possess sufficient knowledge of the sciences, we must conclude that the attribute of choice is a common property of all bodies.

Many years ago the philosopher Hobbes suggested universal motion as a cause of human conduct, but this could not be proved until such motion was itself discovered;—we now know that every substance is continually moving through space and that its molecules are always in motion. It is evident that as our brains have only limited powers, we cannot absolutely prove the universality or the complete indestructibility of motion, and we have to be content with their immense probability. He who waits for absolute knowledge must in nearly all cases wait forever. As the evidence in support of the universality of natural causation and the indestructibility of motion is vast, and as these principles have never been clearly disproved, I venture to treat them as absolute in this article, and to employ them as a basis of reasoning in all cases.

That the human organism is subject to the laws and principles of all the sciences does not admit of rational doubt. The same great powers which govern inanimate

bodies govern us, and determine and limit our power of choice; our abode upon this globe is determined, not by our volition but by the power of gravity. Universal natural causation and indestructibility of motion imply universal compulsion and unceasing action;—in accordance with these principles, all bodies, human beings included, act and react upon each other by their own incessant energy, and their behavior and differences of behavior may be attributed to their movements and differences of movement. Every different metal and compound has different properties and yields a different spectrum, and we know by these differences of their spectra that each has a different group of internal movements; we know also that their properties and spectra are simultaneously affected by change of temperature, so that these attributes in them are intimately connected together. Change of motion frequently involves change of property; even the mere change of visible motion of a body is attended by change of behavior, thus rapid longitudinal movement of a chain imparts to it rigidity and power of resistance to bending; the difference of property of a gyroscope when at rest and when in motion is another example, whilst in motion it resists being twisted. That the chief principles of mechanics pervade human actions is certain, the fact that "a body in a state of motion tends to continue in that state of motion" is as true of man as it is of the worlds in space; it is illustrated by "the force of habit" in us, and by the difficulty we experience in altering our course of conduct, or of obliterating our early impressions. All bodies, ourselves included, resist change under certain conditions, and yield to it under certain others; thus "an old dog cannot be taught new tricks" but a young one can; the condition of age affects the result.

b. GENERAL NATURE OF CHOICE.

Choice is an act of selection, a taking, accepting, or rejecting one thing or course of action in preference to another; it occurs both in dead and living bodies, and like all other properties and actions, it is subject to natural laws and is limited by opposing influences. Every material body during movement chooses the path of least resistance; and it is useless for any man to choose a course of conduct in any case in which the resistance is too great or his power too small. Choice is not necessarily a personal matter, it occurs in dead substances, in man it is often a result of feeling, and occasionally of comparison and inference. All parts of our body are nearly always choosing and rejecting, bone chooses the material for bone, and muscle for muscle, and rejects all others. The great bulk of our acts of choice and rejection occur without our noticing them, and though myriads occur continually we feel very few of them; they are more numerous during our waking state than during sleep, because we are then more active. Choice in us and other animals is largely a cerebral and nervous action, when we choose, either consciously or unconsciously, nerve-substance moves; when choice happens either in dead or living bodies, the molecules move. Similar to all inanimate substances, we obey the law of action and reaction; bodily change produces choice, and by reaction choice produces bodily change; thus if we feel too warm the heat compels us to choose and move to a cooler place.

The attributes of choice and guidance are manifested in the phenomena of astronomical movements, magnetic action, electrolysis, crystal-formation, chemical union, plant-life, etc. Thus the sun guides the planets; the planets guide their satellites; the earth guides meteors and other falling bodies, and each guided body reacts upon its guiding one in a similar manner. A magnet selects particles

of iron from metallic mixtures, and guides pieces of iron moving near it; the magnet moves the iron, and the iron reacts upon and moves the magnet. If a piece of zinc is immersed in a suitable solution of mixed salts of zinc, iron, tin, copper, silver and gold, it first selects and guides the gold, and afterwards the silver and copper, to form a metallic precipitate. Similar acts of choice and rejection occur in the processes of electro-gilding, silvering, coppering, and in the electrolytic refining of copper, and we thus obtain purer metals. In the formation of pure crystals of substances from impure liquids, each crystal, during its growth, selects and determines, each to its proper place on its surface, myriads of suitable molecules which go to form its substance. Similar acts of selection, rejection, and guidance happen during the formation of ice from impure water, and the ice is purer than the water. In cases of chemical union in mixed solutions, an acid usually selects the strongest bases first. Plants have similar powers, thus they prefer soil which contains moisture, many will only grow in the light, a few only in the dark, some will only grow where there is common salt, and others where there is zinc in the soil, "fungi in general prefer decaying animal matter":—plants also act and react upon each other and upon us.

In all these cases, and in a multitude of others, both dead and living bodies choose, reject, guide, and control, without the aid of an occult personal ego or being to superintend the process, and there is no sufficient evidence to prove that human brains do not: nevertheless, erroneous ideas to the contrary form a necessary preliminary to true ones in the evolution of mankind, and this so far justifies the existence and persistence of error and untruth. That acts of choice or self-guidance are not proofs of the existence of life, consciousness, volition, "free-will," or intellect, in the body that chooses or guides, is further

shown by the circumstance that there are self-regulating clocks, watches, musical boxes, gas-regulators, water-regulators, watchmen's tell-tales, money-recorders, governors of steam-engines, etc., all depending essentially upon the automatic action of natural energy.

It is not sufficiently recognized that we derive our properties and abilities largely from inanimate substances, and that the fundamental rudiments of human conduct, including the ability of choice and self-guidance, can be traced downwards from man through the lower animals and plants, and be detected in minerals and metals; thus, under the influence of light and heat, grass is formed from earth, carbonic acid, air, and water:—under that of hunger, sheep and cows are formed chiefly from grass: and under the same imperative influence, we are formed largely from wheat, water, beef, and mutton. This is a crude outline of the process of conversion of earth, air, and water, together with more or less of their properties, into man and his abilities. Inanimate substances still retain their fundamental properties, and are not destroyed, when they enter into the composition of living plants or animals, oxygen still remains oxygen, and nitrogen continues to be nitrogen, when they become part of the human body; the property of weight is quite unaltered, an ounce of water still weighs an ounce after we have drunk it; common salt in our blood still retains its characteristic property of producing a white precipitate in a solution of a salt of silver; the combustible substance carbon contained in our tissues still has the power of uniting with oxygen, and produces bodily heat; solutions of silver, taken internally as medicines, color the human skin on exposure to light as they do a photographic surface. These examples are sufficient to show that the properties, even of metals and other inorganic substances, are to some extent transmissible to and inherited by man.

An act of choice is essentially the same whether it occurs in a metal, a mineral, a plant, or a man, because it is an act of motion; it is however modified more or less in every different body, evidently by the differences of property of the material structures in which it takes place; thus, a magnet chooses iron; and a man would choose meat and money whilst a horse would prefer hay and water. When it occurs in a metal or mineral we call it a molecular action, when in a live plant it is a vital phenomenon, and when in a conscious animal it is largely a nervous action; in man it is further in some cases an intellectual change, because each man is more or less governed and guided by his own arguments. In all animals and plants it is also partly a chemical and physiological movement.

c. THE COMPULSORY AND AUTOMATIC NATURE OF CHOICE.

The compulsory and automatic nature of choice fully agrees with the chief principles of science and the facts of experience: choice is both compulsory and free; we are compelled to choose by omnipotent energy, and are free in our choice within certain limits; this explains the seeming contradiction of free-will and compulsion. Universal energy, acting under suitable conditions, compels us to accept, and under opposite conditions compels us to reject; and in each case compels us to obey. We are as truly compelled to move as the planets in their orbits, and to choose as we are to exist; probably every action in our body is one of compulsory choice or rejection by the respective organs; we know that nearly every step in life is an unavoidable choice between two or more alternatives, and each selection is determined for us by the strongest influence. We are not only compelled to choose and reject by universal energy acting upon us, but also to accept more or less, the consequences of our acts, whether they are

painful or not. We are unceasingly coerced in a multitude of ways, often in opposition to our wishes, and we may rationally conclude that something determines the issue for us whether we perceive it or not. We are compelled by our feelings when we consider it a pleasure or advantage to us, and often by our intellect or other influence when it is prospectively painful or we are unwilling; but in many cases, from a variety of circumstances, we are unable to detect the real cause of our conduct.

Automatic acts of choice and guidance occur throughout the human body; our very life depends upon the production of heat by the spontaneously selective oxidation of our tissues by the oxygen contained in the blood. The various solids and liquids necessary to maintain life, are selected from the food and blood by the spontaneous energy of the various organs, and each different material is automatically guided to its appropriate place; thus nerve selects and guides the material for nerve, and brain that for brain. Nearly all the organs of the animal body also act and react upon each other through the nerves, and, so far as we know, the automatic action of choosing and rejecting attains its highest degree of complexity and completeness in human nerve-substance. Many of our acts of choice and determination *seem* due to some occult spiritual agency, but they only appear so because of our very limited knowledge and ability, we cannot usually perform them and simultaneously watch our performance.

By deeply studying such questions in a scientific manner we are repeatedly brought to the conclusion that the human brain is extremely weak in complex subjects, and that it would require one vastly larger to contain all the knowledge necessary to completely answer complex questions. In consequence of limited power and other circumstances, even conscious automatic action in living creatures does not always select that course which is most conducive

to life: thus all animals make mistakes and suffer accidents; even men occasionally poison themselves inadvertently, and the number of errors they commit is extremely great.

In the order of natural evolution of human abilities, automatic choice precedes conscious choice, and becomes the latter when perceived by the senses and compared by the intellect; conscious choice therefore is not an act of creation.

d. CHANGES OF ENERGY IN ACTS OF CHOICE AND GUIDANCE.

Cerebral guidance is an act of change, an alteration of one action or movement by another. Changes of energy are continually happening in all bodies concurrently with alterations of temperature, pressure, contact or presence, etc. of other bodies. Multitudes of such changes are continually occurring in the human body and brain during acts of thought, choice and guidance, and are accompanied by chemical oxidation of nerve-substance and the production and loss of heat. The various forms of natural energy, such as heat, light, magnetism, electricity, chemical power, etc., whether in living men or in dead substances, are mutually convertible, when one form is expended another is produced, and during the change a portion is usually diffused away and lost. Longitudinal motion is changed into circular by the ordinary crank and piston rod, whilst a portion of the energy is converted into heat by the friction and is lost. When the molecular motion of heat is converted into motion of mass by a steam engine, more than eighty per cent. of the original energy of the coal is dissipated. In the dynamo, motion of mass is converted into electric current, and partly into heat which is lost. A magnet loses magnetic energy when it attracts and guides a piece of iron to itself, and regains the energy when the

iron is pulled away. A crystal, whilst passing from the liquid to the solid state during its acts of choice and guidance, nearly always loses heat, and in some cases light. When a railway train passes round a curve, friction, heat, and sparks are produced, and the velocity of the train is diminished; on each great line of railway quite a large weight of iron is ground off the rails and wheels each day by the energy expended during guidance of the vehicles.

Not only are choice, guidance, and control, acts of conversion of motion, but they are also intimately related to storage and expenditure of energy.

The demand and supply of power are each in nearly all bodies very variable; in a man the demand is great during the day and small during the night; without an accumulation of it in a latent or potential state he cannot choose or "make up his mind," and without a storage of cerebral impressions in the form of memory he lacks power of self-guidance. In the human body energy is stored up in the blood and tissues during rest, and expended during activity;—in a watch it is accumulated in the spring during winding; and in a steam engine it is stored up in the moving fly-wheel.

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FRIEDRICH NIETZSCHE.

AMONG all modern philosophers there is perhaps no one who exerts a greater fascination upon large masses of people than Friedrich Nietzsche. The most remarkable instance of the power which he is apt to exercise upon certain minds within the range of my own experience is the case of a young clergyman who confessed to me that after a perusal of *Thus Spake Zarathustra* he had felt as if intoxicated for several months by the idea of the sovereignty of his own will; and we ask, What is the reason of this powerful influence of an author who is properly speaking neither a philosopher nor a poet, but a combination of the two—an erratic thinker of immature thoughts?

There are several reasons which make Nietzsche attractive to a certain class of people. First of all his style is pointed, and secondly he appeals, not to the intellect, but to sentiment, to passions, to our ambition, and to our vanity—all of which is human, too human, *menschlich und allzu menschlich*. His ideas, expressed in aphorisms, are easily understood. They are not presented in a logical, orderly way, but sound like reiterated challenges to do battle. They are appeals to all wild impulses and a clamor for the right of self-assertion. Thus Nietzsche appeals to the pride of sovereignty, of irresponsibility, of absolute independence. No order should be respected, no God, no superior, no law, not even logic, or truth. Nietzsche pro-

claims the coming of the "overman," but his overman* is not superior by intellect, wisdom, or nobility of character, but by vigor, by strength, by an unbending desire for power and an unscrupulous determination. The blond barbarian of the north who tramples under foot the citizens of Greece and Rome, Napoleon I, and the Assyrian conqueror,—such are his heroes in whom this higher manhood formerly manifested itself.

Other philosophers have claimed that rights imply duties and duties, rights. Nietzsche knows of rights only. Duties are for slaves and for fools.

Nietzsche passed through three periods in his development. He was first a follower of Schopenhauer and an admirer of Wagner, but he shattered his idols and became a convert to Auguste Comte's positivism. His main desire was to realize the real life and make his home not in an imaginary Utopia but in this actual world of ours. He blamed the philosophers as well as the religious leaders and ethical teachers for trying to make mankind believe that the real world is purely phenomenal, that they replace it by the world of thought which they called "the true world" or the world of truth. To Nietzsche the typical philosopher is Plato. He and all his followers are accused of hypocrisy for making people believe that "the true world" of their own fiction is real and that man's ambition should be to attain to this "true world" (the world of philosophy, of science, of art, of ethical ideals) built above the real world. Nietzsche means to shatter all the idols of the past, and he has come to the conclusion that even scientists were guilty of the same fault. They erected a world of thought, of subjective conception from the materials of the real world, and so he denounces even their attempts at constructing a "true world" as either a self-

*We prefer the purely Saxon "overman" to the barbaric combination of "superman" in which Latin and Saxon are mixed against one of the main rules for the construction of words.

mystification or a lie. It is as imaginary as the world of the priest. In order to lead a life worthy of the overman, we should assert ourselves and feel no longer hampered by rules of conduct or bored by logic or any consideration of truth.

Such in brief is the gospel of Nietzsche which, however, is not intended for the mass of mankind, but only for the elect few, for his disciples. The mass of mankind are to be enslaved and become subservient to the overman, the representative of Nietzsche's philosophy. This view constitutes his third period, in which he wrote those works that are peculiarly characteristic of his own philosophy.

Nietzsche had learned from Schopenhauer that this world is a world of misery and struggle, but he did not accept Schopenhauer's theory of the negation of the will. He retained Schopenhauer's contempt for previous philosophers (presumably he never tried to understand them) yet he resented the thought of a negation of life and replaced it by a most emphatic assertion.

Nietzsche argued that our conception of truth and our ideal world is but a phantasmagoria, and the picture of the universe in our consciousness a distorted image of real life. Our pleasures and pains, too, are both transient and subjective. Accordingly it would be a gross mistake for us to exaggerate their importance. What does it matter if we endure a little more or less pain, or of what use are the pleasures in which we might indulge? The realities of life consist in power and in our dominion over the forces that dominate life. Knowledge and truth are of no use unless they become subservient to this realistic desire for power. They are mere means to an end which is the superiority of the overman.

Nietzsche is far from regarding his philosophy as timely. He was a proud and aristocratic character, spoiled from childhood by an unfaltering admiration on the part

of both his mother and sister. It was unfortunate for him that his father had died before he could influence the early years of his son through wholesome discipline. Not enjoying a vigorous constitution Nietzsche was greatly impressed with the thought that a general decadence was overshadowing mankind. The truth was that his own bodily system was subject to many ailments which hampered his full mental development. He was hungering for health, he envied the man of energy, he longed for strength and vigor, but all this was denied him, and so these very shortcomings of his own bodily strength—his own decadence—prompted in him a yearning for bodily health, for an unbounded exercise of energy, and for success. These were his dearest ideals, and his desire for power was his highest ambition. He saw in the history of human thought, the development of the notion of the true world, which to him was a mere subjective phantom, a superstition; but a reaction must set in, and he prophesied that the doom of Nihilism would sweep over the civilized world applying the torch to its temples, churches and institutions. Upon the ruins of the old world the real man, the overman, would rise and establish his own empire, an empire of unlimited power in which the herds, i. e., the common people would become subservient. The "herd animal" (so Nietzsche called any one foolish enough to recognize morality and truth) is born to obey. He is destined to be trodden underfoot by the overman who is strong and also unscrupulous enough to use the herds and govern them.

Nietzsche was by no means under the illusion that the rule of the overman would be lasting, but he took comfort in the thought that though there would be periods in which the slaves would assert themselves and establish an era of the herd animals, the overman would nevertheless assert himself from time to time, and this was what he called

his "doctrine of the eternal return"—the gospel of his philosophy. The highest summit of existence is reached in those phases of the denouement of human life when the overman has full control over the herds which are driven into the field, sheared and butchered for the sole benefit of him who knows the secret that this world has no moral significance beyond being a prey to his good pleasure.

Nietzsche's favorite animals are the proud eagle and the cunning serpent, the former because it typifies aristocracy, the latter as the wisest among all creatures of the earth. It is a strange and exceptional combination, for these two animals are commonly represented as enemies. The eagle and serpent was the emblem of ancient Elis and

4266 COINS OF ANCIENT ELIS. 4032

Each is worth two drachmæ. One shows on the obverse a Zeus head with a laurel wreath, the other a winged Victory.

is at present the coat-of-arms of Mexico, but in both cases the eagle is interpreted to be the conqueror of the serpent, not its friend, carrying it as his prey in his claws.

Nietzsche, feeling that his thoughts were untimely, lived in the hope of "the coming of the great day" on which his views would find recognition, and he incorporated his ideal in "Zarathustra," the great prophet of his philosophy. He looked upon the present as a rebellion against the spirit of strength and vigor; Christianity especially, and its doctrine of humility and love for the down-trodden was hateful to him. He speaks of it as a rebellion of slaves and places in the same category as the democraticism con-

stituting at present the tendency of human development which he denounces as a pseudo-civilization.

With all his hatred of religion Nietzsche was an intensely religious character, and knowing that he could not clearly see a connection between his so-called "real world" and his actual surroundings, he developed all the symptoms of religious fanaticism which characterizes religious leaders of all ages. He indulged in a mystic ecstacy, preaching it as the essential feature of his philosophy, and his Dionysiac enthusiasm is not the least of the intoxicants which are contained in his thought and bring so many poetical and talented but immature minds under his control.

It is obvious that "the real world" of Nietzsche is more unreal than "the true world" of philosophy and of religion which he denounces as fictitious, but he was too naive and philosophically crude to see this. Nietzsche's "real world" was his personal imagination, while the true world of science is at least a thought-construction of the world which pictures facts with objective exactness; it is controlled by experience and can be utilized in practical life; it is subject to criticism and its propositions are being constantly tested either to be refuted or verified. Nietzsche's "real world" is the hope (and perhaps not even a desirable hope) of a feverish brain whose action is influenced by a decadent body.

Nietzsche's so-called "real world" is one ideal among many others. It is as much subjective as the ideals of other mortals,—of men who seek happiness in wealth, or in pleasures, or in fame, or in scholarship, or in a religious life—all of them imagine that the world of their thoughts is real and the goal which they endeavor to reach is the only thing that possesses genuine worth. In Nietzsche's opinion all were dreamers catching shadows, but the shadow of his own fancy appeared to him as real.

Nietzsche's hope is certainly not desirable for the mass

of mankind, but even the fate of the overman himself would appear as little enviable a condition as that of the tyrant Dionysius under the sword of Damocles, or the Czar of Russia living in constant fear of the anarchistic bomb.

In spite of Nietzsche's hunger for the realities of life, that is to say for objectivity, he was the most subjective of all philosophers—so much so that he was incapable of formulating any thought as an objectively precise statement. All his writings are aphoristic statements; they are but very loosely connected, and we find them frequently contradictory. The decadence which he imputes to mankind is a mere reflection of his own state of mind, and the strength which he praises is that quality in which he is most sorely lacking. Nietzsche himself had the least possible connection with active life. He was unmarried, had no children, nor any interests beyond his ambition, and having served as professor of the classical languages for some time at the small university of Basel, he was for the greater part of his life without a calling, without duties, without aims. He never ventured to put his own theories into practice. He did not even try to rise as a prophet of his own philosophy, and remained in isolation to the very end of his life.

Nietzsche must have felt the contradiction between his theories and his habits of life, and it appears that he suffered under it more than can be estimated by an impartial reader of his books. He was like the bird in the cage who sings of liberty, or an apoplectic patient who dreams of deeds of valor as a knight in tournament or as a wrestler in the prize ring. Never was craving for power more closely united with impotence!

It is characteristic of him that he said, "If there were a God, how should I endure not to be God?" and so his ambition impelled him at least to prophesy the coming of his ideal, i. e., robust health, full of bodily vigor and animal

spirits, unchecked by any rule of morality, and an unstinted use of power.

Nietzsche had an exaggerated conception of his vocation and he saw in himself the mouthpiece of that grandest and deepest truth, viz., that man should dare to be himself without any regard of morality or consideration for his fellow beings. And here we have the tragic element of his life. Nietzsche, the atheist, deemed himself a God incarnate, and the despiser of the Crucified suffered a martyr's fate in offering his own life to the cause of his hope. The earnestness with which he preached his wild and untenable doctrines appeals to us and renders his figure sympathetic, which otherwise would be grotesque. Think of a man who in his megalomania preaches a doctrine that justifies an irresponsible desire for power! Would he not be ridiculous in his impotence to actualize his dream? and on the other hand, if he were strong enough to practice what he preached, if like another Napoleon, he would make true his dreams of enslaving the world, would not mankind in self-defence soon rise in rebellion and treat him as a criminal, rendering him and his followers incapable of doing harm? But Nietzsche's personality, weak and impotent and powerless to appear as the overman and to subjugate the world to his will, suffered excruciating pains in his soul and tormented himself to death, which came to him in the form of decadence—a softening of the brain.

It may be interesting in this connection to mention the case of an American equivalent to Nietzsche's philosophy, which so far as I know has never yet seen publicity. The writer of these lines became acquainted with a journalist who has worked out for his own satisfaction a new system of philosophy which he calls "Christian economics," the tendency of which would be to preach a kind of secret doctrine for the initiated few who would be clever enough

to avail themselves of the good opportunity. He claimed that the only thing worth while in life is the acquisition of power through the instrumentality of money. He who acquires millions can direct the destiny of mankind, and this tendency was first realized in the history of mankind in this Christian nation of ours, whose ostensible faith is Christianity. Our religion, he argues, is especially adapted to serve as a foil to protect and conceal the real issue, and so he calls his world-conception, "Christian economics." Emperors and kings are mere puppets who are exhibited to general inspection, and so are presidents and all the magistrates in office. Political government has to obey the behests of the financiers, and the most vital life of mankind resides in its economical conditions.

The inventor of this new system of "Christian economics" would allow no other valuation except that of making money, on the sole ground that science, art and the pleasures of life are nothing to man unless he is in control of power which can be had only through the magic charm of the almighty dollar.

I will not comment upon his view, but will leave it to the reader, and am here satisfied to point out its similarity to Nietzsche's philosophy. There is one point only which I will submit here for criticism and that is the principle of valuation which is a weak point with both the originator of "Christian economics" and with Friedrich Nietzsche.

Nietzsche proclaimed with great blast of trumpets, if we may so call his rhetorical display of phrases, that we need a re-valuation of all values; but the best he can do is to establish a standard of valuation of his own. Every man in this world attains his mode of judging values according to his character, which is formed partly of inherited tendencies, partly by education and is modified by his own reflections and experiences. There are but few persons in this world who are clearsighted enough to for-

mulate the ultimately guiding motive of their conduct. Most people follow their impulses blindly, but in all of them conduct forms a certain consistent system corresponding to their own idiosyncracy. These impulses may sometimes be contradictory, yet upon the whole they will all agree, just as leaves and blossoms, roots and branches of the same tree will naturally be formed according to the secret plan that determines the growth of the whole organism. Those who work out a specially pronounced system of moral conduct do not always agree in practical life with their own moral principle, sometimes because they wilfully misrepresent it and more frequently because their maxims of morality are such as they themselves would like to be, while their conduct is such as they actually are. Such are the conditions of life and we will call that principle which as an ultimate *raison d'être* determines the conduct of man, his standard of valuation. We will see at once that there is a different standard for each particular character.

A scientist as a rule looks at the world through the spectacles of the scientist. His estimation of other people depends entirely on their accomplishments in his own line of science. Artist, musician, or sculptor does the same. To a professional painter scarcely any other people exist except his pupils, his master, his rivals and especially art patrons. The rest of the world is as indifferent as if it did not exist; it forms the background, an indiscriminate mass upon which all other values find their setting. All the professions and vocations, and all the workers along the various lines of life are alike in that every man has his own standard of valuation.

A Napoleon or a Cæsar might have preached the doctrine that the sciences, the arts and other accomplishments are of no value if compared with the acquisition of power, but I feel sure that it would not have been much heeded by the mass of mankind, for no one would change his

standard of value. A financier might publicly declare that the only way to judge people is according to the credit they have in banking, but it would scarcely change the standard of judgment in society. Beethoven knew as well as any other of his contemporaries the value of money and the significance of power, and yet he pursued his own calling, fascinated by his love for music. The same is true not only of every genius in all the different lines of art and science, but also of religious reformers and inventors of all classes. Tom, Dick, and Harry in their hankering for pleasure and frivolous amusement are not less under the influence of the conditions under which they have been born than the great men whose names are written in the book of fame. It is difficult for every one of us to create for himself a new standard of valuation, for what Goethe says of man's destiny in a poem entitled *Daimon*, is true:

"As on the day which has begotten thee
The sun and planets stood in constellation,
Thus growest and remainest thou to be,
For 't is life's start lays down the regulation
As thou must be. Thyself thou canst not flee.
Such sibyl's is and prophet's proclamation.
For truly, neither force nor time dissolveth,
Organic form as, living, it evolveth."*

Our attitude in life depends upon our character, and the basic elements of character are the product of the circumstances that gave birth to our being. Our character enters unconsciously or consciously in the formulation of

* The original reads thus:
"Wie an dem Tag der dich der Welt verliehen,
Die Sonne stand zum Grusse der Planeten,
Bist alsobald and fort und fort gediehen
Nach dem Gesetz, wonach du angetreten.
So musst du sein, dir kannst du nicht entfliehen,
So sagten schon Sibyllen, so Propheten;
Und keine Zeit und keine Macht zerstückelt,
Geprägte Form, die lebend sich entwickelt."
So far as I know, these lines have never been translated before.

our standards of value which we will find to be the most significant factors of our destinies. Now the question arises, Is the standard of value which we set up, each one of us according to his character, purely subjective or is there any objective criterion of its worth?

We must understand that to a great extent our choice of a profession and other preferences in our occupations or valuations are naturally different according to conditions; some men are fit to be musicians, or scholars, or traders, or farmers, or manufacturers, and others are not. The same profession would not be appropriate for every one. But there is a field common to all occupations which deals with man's attitude toward his fellow beings and, in fact, toward the whole universe in general. This it is with which we are mainly concerned in our discussion of a criterion of value because it is the field occupied by religion, philosophy and ethics. Tradition has sanctioned definite views on this very subject which have been codified in certain rules of conduct different in many details in different countries according to religion, national and climatic conditions, and the type of civilization; yet after all, they agree in most remarkable and surprising coincidences in all essential points.

Nietzsche, the most radical of radicals, sets up a standard of valuation of his own, placing it in the acquisition of power, and he claims that it alone is entitled to serve as a measure for judging worth because, says he, it alone deals with that which is real in the world; yet at the same time he disdains to recognize the existence of any objective criterion of the several standards of value. If he were consistent, he ought to give the palm of highest morality to the man who succeeds best in trampling under foot his fellowmen, and he does so by calling him the overman, but he does not call him moral. To be sure this would be a novel conception of morality and would sanction what is

commonly execrated as one of the most devilish forms of immorality. Nietzsche takes morality in its accepted meaning, and so in contradiction to himself denies its justification in general.

Considering that every one carries a standard of valuation in himself we propose the question, "Is there no objective criterion of valuation, or are all valuations purely subjective?" This question means whether the constitution of the objective world in which we all live, is such as to favor a definite mode of action determined by some definite criterion of value.

We answer that subjective standards of valuation may be regarded as endorsed through experience by the course of events in the world whenever they meet with success, and thus subjective judgments become objectively justified. They are seen to be in agreement with the natural course of the world, and those who adhere to them would in the long run be rewarded by survival. Such an endorsement of standards can be determined by experience and has resulted in what is commonly called "morality." We may here take for granted that the moral valuation is a product of many millenniums and has been established, not only in one country and by one religion, nor in one kind of human society, but in perfect independence in many different countries, under the most varied conditions, and finds expression in the symbolism of the most divergent creeds. The beliefs of a Christian, of a Buddhist, of a Mussulman in Turkey, or a Taoist in the Celestial Empire, of a Parsee in Bombay, or a Japanese Shintoist, are all as unlike as they can be, but all agree as to the excellency of moral behavior which has been formulated in these different religions in sayings incorporated in their literature. We find very little if anything contradictory in their standards of valuation, and we make bold to say that if there is any objective norm for the subjective valuation of man it is

this moral consensus in which all the great religious prophets and reformers of mankind agree.

We will grant that Nietzsche's demand of a transvaluation of all values may mean to criticize the narrow doctrines and views of the religion of his surroundings. But as he expresses himself and according to his philosophical principle he goes so far as to condemn not only the husk of all these religious movements, but also their spirit. In spite of his subjectivism which denies the existence of anything ideal, and goes so far as to deny the right even of truth to have an objective value, Nietzsche establishes a new objectivism, and proposes his own, and indeed very crude, subjective standard of valuation as the only objective one worthy of consideration for the transvaluation of all values.

Nietzsche's real world, or rather what he deemed to be the real world, is a dream, the dream of a sick man, to whom nothing possesses value save the boons denied him, physical health, strength, power to dare and to do.

The transvaluation of all values which Nietzsche so confidently prophesies will not take place, at least not in the sense that Nietzsche believes. There is no reason to doubt that in the future also history will follow the old conservative line of development in which different people according to their different characters will adopt their own subjective standards, and nature, by a survival of the fittest will select those for preservation who are most in agreement with this real world in which we live, a world from which Nietzsche, according to the sickly condition of his constitution, was separated by a wide gulf. He thirsted for it in vain, and we believe that he had a wrong conception of the wealth of its possibilities and viewpoints.

It is said that barking dogs do not bite, and this being true, we must look upon Nietzsche's philosophy as a harmless display of words and a burning desire for power with-

out any intention for practicing what he preached. His philosophy, so far as he is concerned, is a purely Platonic love of an unattainable star the brilliance of which dazzled the imagination of a childlike peaceful weakling. Suppose, however, for argument's sake, that Nietzsche had been a man of robust health, and that he had been born at the time of great disturbances, offering unlimited chances to an unscrupulous ambition, would he under these circumstances, have led the life he preached, and in case he had done so, would he have boldly and unreservedly admitted his principles while carrying out his plans? Did ever Cæsar or Napoleon or any usurper, such as Richard III, who unscrupulously aspired for power, own that he would shrink from nothing to attain his aim? Such a straightforward policy for any schemer would be the surest way of missing his aim. Such men, on the contrary, have played hypocrites, and have pretended to cherish ideals generally approved by the large masses of the people whom Nietzsche calls the herd. So it is obvious that the philosophy of Nietzsche if it were ever practically applied, would have become a secret doctrine known only to the initiated few, while the broad masses would be misguided by some demonstrative show of moral principles that might be pleasing to the multitudes and yet at the same time conceal the real tendency of the overman to gain possession of his superior position.

Nietzsche's influence upon professional philosophers is comparatively weak. Whenever mentioned by them, it is in criticism, and he is generally set aside as onesided, and perhaps justly, because he was truly no philosopher in the strict sense of the word. He was no reasoner, no logician, and we can not, properly speaking, look upon his philosophy as a system or even a systematized view of the world. Nietzsche made himself the exponent of a tendency, and as such he has his followers among large mas-

ses of those very people whom he despised as belonging to the herds. As Nietzsche idealized this very quality in which he was lacking, so his followers recruit themselves from the ranks of those people who more than all others would be opposed to the rule of the overman. His most ardent followers are among the nihilists of Russia, the socialists and anarchists of all civilized countries. The secret reason of attraction, perhaps unknown to themselves, seems to be Nietzsche's defense of the blind impulse and the privilege which he claims for the overman to be himself in spite of law and order and morality, and also his contempt for rules, religious, philosophical, ethical or even logical, that would restrict the great sovereign passion for power.

Nietzsche claims to be the first philosopher who maintained the principle of unmorality, implying the absolute sovereignty of man and the foolishness as well as falsity of moral maxims. He insists that the overman is beyond good and evil, and yet it is obvious that he was only the first philosopher who has boldly proclaimed this principle of unmorality. His maxim (or lack of maxims) has been stealthily and secretly in use among those classes whom he calls "overmen," great and small. The great overmen are conquerors and tyrants, who meteorlike appear and disappear, the small ones are commonly characterized as the criminal classes; but there is this difference between the two, that the former, at least so far as they have succeeded, recognize the absolute necessity of establishing law and order, and though they may temporarily have infringed upon the rules of morality themselves, they have finally come always to the conclusion that in order to maintain their position they must enforce upon others the usual rules of morality.

Both Alexander and Cæsar were magnanimous at the right moment. They showed mercy to the vanquished, they

exercised justice frequently against their own personal likes or dislikes, and were by no means men of impulse as Nietzsche would have his overman be. The same is true of Napoleon whose success is mainly due to making himself subservient to the needs of his age. As soon as he assumed the highest power in France, Napoleon replaced the frivolous tone at his court, to which his first wife Josephine had been accustomed, by an observance of so-called *bourgeois* decency, and he enforced it against her inclinations and his own.

Further, Napoleon served the interests of Germany more than is commonly acknowledged by sweeping out of existence the mediæval system of innumerable sovereigns, ecclesiastical as well as secular, who in conformity with the conservative tenor of the German people had irremediably ensconced themselves in their hereditary rights to the disadvantage of the people. Moreover, the *Code Napoleon,* the new law book, perhaps the most enduring work of Napoleon, was compiled by the jurists of the time, not because Napoleon cared for justice, but because he saw that the only way of establishing a stable government was by acknowledging rules of equity and by enforcing their recognition. It is true that Napoleon made his service in the cause of right and justice a pedestal for himself, but in contrast to Nietzsche's ideas we must notice that this recognition of principle was the only way of success to a man whose natural tendency was an unbounded egotism, an unlimited desire for power.

The writings of Nietzsche will make the impression of a youthful immaturity upon any half-way serious reader. There is a hankering after originality which of necessity leads to aberrations and a sovereign contempt for the merits of the past. The world seems endangered, and yet any one who would seriously try to live up to Nietzsche's ideal must naturally sober down after a while, and we

may apply to him what Mephistopheles says of the baccalaureus:

"Yet even from him we're not in special peril
He will, ere long, to other thoughts incline.
The must may foam absurdly in the barrel,
Nathless, it turns at last to wine."

Tr. by Bayard Taylor.

Nietzsche did not live long enough to experience a period of matured thought. He died before the fermentation of his mind had come to its normal close, and so his life will remain forever a great torso, without intrinsic worth, but suggestive and appealing only to the immature, including the "herd animal" who would like to be an overman.

Nietzsche is an almost tragic figure that will live in art as a brooding thinker, a representation of the dissatisfied, a man of an insatiable love of life, with wild and unsteady looks, proud in his indomitable self-assertion, but broken in body and spirit. Such he was in his last disease when his mind was wrapt in the eternal night of dementia, the oppressive consciousness of which made him exclaim in lucid moments the pitiable complaint, "*Mutter, ich bin dumm.*" As such he is represented in Klein's statue, which in its pathetic posture is a psychological masterpiece.

Nietzsche's works are poetic effusions more than philosophical expositions and yet we would hesitate to call him a poet. His poems are not poetical in the usual sense. They lack poetry and yet they appeal not only to his admirers, but also to his critics and enemies. Most of them are artificial yet they are so characteristic that they are interesting specimens of a peculiar kind of taste. They strike us as ingenious, because they reflect his eccentricities.

We expect that translations of the most important

STATUE OF NIETZSCHE. 5157

By M. Klein.

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poetical effusions of Nietzsche will be welcome to our readers.

Here is Nietzsche the man as he characterizes himself in a poem entitled "Ecce Homo."*

"Yea, I know from whence I came!
Never satiate, like the flame
Glow I and consume me too.
Into light turns what I find,
Cinders do I leave behind,
Flame am I, 'tis surely true."

His ambition for originality is expressed in four lines, which we translate faithfully, preserving even the ungrammatical use of the double negative, as follows:

"In my own house do I reside,
Did never no one imitate,
And every master I deride,
Save if himself he'd derogate."

In another little poem Nietzsche imitated Goethe's famous conclusion of the second part of Faust in which the "real world" of transient things is considered as a mere symbol of the true world of eternal verities. Nietzsche mocks Goethe's proposition, by imitating the style and rhythm of his lines which we translate thus:

"The non-deciduous
Is a symbol of *thy* sense,
God ever invidious,
A poetical licence.
World-play domineeringly
Mixes semblance and fact,
And between them us sneeringly
The ever-foolish has packed."

*"Ja, ich weiss woher ich stamme!
Ungesättigt gleich der Flamme,
Glühe und verzehr ich mich,
Licht wird alles was ich fasse,
Kohle alles was ich lasse:
Flamme bin ich sicherlich!"

We conclude with another poem which is perhaps the best known of all. It appeared at the end of *Thus Spake Zarathustra*, the most impressive work of Nietzsche, and is called by him "The Drunken Song." The thoughts are

O MENSCH GIEB ACHT!
WAS SPRICHT DIE TIEFE MITTERNACHT?
„ICH SCHLIEF, ICH SCHLIEF—,
„AUS TIEFEM TRAUM BIN ICH ERWACHT:—
„DIE WELT IST TIEF,
„UND TIEFER ALS DER TAG GEDACHT.
„TIEF IST IHR WEH—,
„LUST TIEFER NOCH ALS HERZELEID:
„WEH SPRICHT: VERGEH!
„DOCH ALLE LUST WILL EWIGKEIT—,
„—WILL TIEFE, TIEFE EWIGKEIT!"
ALSO SPRACH ZARATHUSTRA

almost incoherent and it is difficult to say what is really meant by it. Nothing is more characteristic of Nietzsche's attitude and the vagueness of his fitful mode of thought.

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It has been illustrated by Hans Lindlof, in the same spirit in which Richard Strauss has written a musical composition on the theme of Nietzsche's *Thus Spake Zarathustra.*

"The Drunken Song" reads in our translation as follows:

"Man, listen, pray!
What the deep midnight has to say:
'I lay asleep,
'But woke from dreams deep and distraught.
'The world is deep,
'E'en deeper than the day e'er thought.
'Deep's the world's pain,
'Joy deeper still than heartache burneth.
'Pain says, Life's vain!
'But for eternity Joy yearneth,
'For deep eternity Joy yearneth."*

EDITOR.

* Prof. William Benjamin Smith has translated this same song, and we think it will be interesting to our readers to compare his translation which has not yet been published elsewhere, with our rendering. It reads as follows:

"Oh Man! Give ear!
What saith the midnight deep and drear?
'From sleep, from sleep
'I woke as from a dream profound.
'The world is deep
'And deeper than the day can sound.
'Deep is its woe,—
'Joy, deeper still than heart's distress.
'Woe saith, Forego!
'But Joy wills everlastingness,—
'Wills deep, deep everlastingness.'"

A FEW HISTORICAL DATA OF THE MODERN SCIENCE OF LANGUAGE.

IN retracing the historical phases of the modern science of language, we are confronted at the outset of our survey by two singular facts: first, that the theory and the technical knowledge of language had remained stationary and unchanged from classical times to the second decade of the nineteenth century; and by the other equally startling fact, that all the achievements of the modern science of language and of comparative philology, have been accomplished within the lapse of only a few decades of the past century. It must be added that the edifice of the science of language that has been reared by the philologists of the nineteenth century, is no mere accumulation of disconnected material, but, by its basic principles, must be regarded as a complete and finished structure. Within the first decade of the present century, accordingly, it may not seem altogether inappropriate to recall to mind, first, the causes of the obstacles which so long impeded and retarded the study and the correct conception of language; and next, briefly to review the progressive stages, which, as it were, irrespective of their duration have led up to the erection of the modern science of language within the narrow space of a few decades. We shall not incur the risk of exaggerating the intrinsic value or the vast bulk of the work that has been performed. In this respect the reader may at once be referred to Prof. Theodore

Benfey's exhaustive volume, published in 1869 at Munich. Germany, and entitled: *History of the Science of Language, and of Oriental Philology in Germany.* The volume in question exclusively relates to work done in Germany by German philologists, and yet, the multitude and variety of subjects must fill us with astonishment. If we should only undertake to write down the names of all those devoted workers in the field of language and philology—in the words of an ancient Sanskrit sentence:—"soon the chalk would drop from our hand!"

That Germany, during the nineteenth century, should have produced such a prodigious number of specialists in this department of research was due to many local causes. Notwithstanding the incontestable fact that German philological scholarship received a vast supply of valuable materials from abroad—from England, France, and other countries—German philologists still may claim the modern science of language as a native German product, or as distinctly a German science.

The intrinsic hindrances to the creation of a genuine science of language have mainly arisen from the philosophical systems (particularly metaphysics and logic) which, during so many centuries, molded and warped the minds of Europe. Throughout the European middle ages theoretical philosophy had conceived the notion of an *absolute speech-form,* and, consequently, it proclaimed the absolute, substantial unity of all human languages.

On the other hand it is generally known that the theoretical philosophy of the past was generally applied to the so-called metaphysical categories—to the abstract notions of being, essence, matter, force, cause, effect, phenomenon, etc.; while logic taught the most general forms of all scientific thinking.

But this abstract philosophy of the middle ages ignored or remained indifferent to the important fact that within

the independent domain of objective reality there is found a parallel series of sciences, viz., a science of nature, and a science of the human spirit,—the science of history, or philology in the broadest sense of the term.

The science of nature and the science of the human spirit follow their own independent laws. Nature and mind do not presuppose respectively the existence of an abstract philosophy of nature, or of an abstract philosophy of history. This would only result in a conflicting dualism—the dualism of theory on the one hand, and of empirical science and of history on the other. It was this very dualism which asserted its supremacy when the abstract philosophy of the middle ages persisted in applying its own exclusive, constructive theories to the objective phenomena of reality.

This dualism was a spontaneous creation of the middle ages, harmonizing perfectly with the dogmatic and scholastic methods of the period. During the middle ages this dualism revealed itself not only in every theorizing tendency of the human mind, but even in the entire organization of social life,—in the form of an antagonizing contrast of nature and mind; of earthly existence, and of life in the beyond; of Church and State; of State and individual; of life external; and of a mystic, inward life.

Under conditions of this kind, any science of nature was impossible, because nature was ignored, and despised.

This fictitious dualism, however, had been unknown to classical Greek antiquity. I can only mention here that the technical terms which are still employed in describing the varied aspects of this dualism—terms like *"a priori," "a posteriori,"* "synthesis," "analysis," "syllogism," "induction," and so forth—all of these, certainly, were used by Aristotle, yet with this important difference, that the Greek philosopher employed these terms in a sense that was entirely different from the significance which later

was imparted to them by the scholastic philosophy of the middle ages. During the middle ages, only logic could rise to the height and dignity of a science, because the Christian dogma and system of theology found that logic proved the most serviceable hand-maid of all arbitrary constructions.

Probably every one is well acquainted with the fact that Lord Bacon, in his *Novum Organum,* was the first who attempted to combine the hair-splitting subtleties of scholastic logic with the creation of a more dignified science of nature. But we must also recall to mind that almost at the same time there arose the French philosopher, Descartes, who, starting from the principle: "*cogito, ergo sum,*" sought for certitude in the cognition of being; while being itself is supposed to result from thinking.

This meant the same as to restore the old conflicting dualism of empiricism and of theory even more pointedly than before; because, with Descartes, *a priori* no longer meant "from the cause," but "from pure thinking" unsupported by experience.

When, at a later date, Kant proposed the doctrine that experimental knowledge, in order to be possible, must be preceded by certain *a priori* cognitions, this German philosopher admittedly imparted a new impulse to philosophy; and it is well known how he himself defined and limited these categories of all our cognitions. Our experimental knowledge forms a compound combination of what we receive through our sensual impressions, and that which our innate power of cognition yields from within. As such this doctrine did not involve a dualism proper; but, nevertheless, it soon furnished an occasion for a revival of the old dualism when Hegel maintained that he had found that which Descartes had sought for, to wit, absolute certainty;—a knowledge of being that was as certain as thinking. Hegel contended that not only the abstract *a*

priori forms of our cognitions, but also the form and contents of all being, are found within the mind, and that mind itself furnishes these contents.

I have here mentioned these past philosophical systems only in order to show that in reality they were incompatible with either a correct conception of language, or with the creation of a genuine science of language.

Philosophy could only conceive language as *substance* —a "thing-in-itself" (*Ding an sich*), as it was called. But the modern science of language has proved the affinity of language with the whole evolution of humanity in history; and therewith, the genuine science of language, also, has done away with absolute methods and the *a priori* definition of language of past philosophical systems.

It is generally admitted that during the earlier decades of the nineteenth century no philologist has worked with greater energy against that philosophical conception of speech than has Dr. H. Steinthal, the late professor of the general science of language in the University of Berlin, Germany; of Old Testament interpretation at the Hebrew High School of the same city; and (together with Professor Lazarus) the editor of the German *Zeitschrift für Völkerpsychologie.* In one of his earliest works, entitled: *Die Sprachwissenschaft Wilhelm von Humboldts und die Hegelsche Philosophie,* (published in 1848), Dr. Steinthal, as interpreter and emendator of von Humboldt's philological ideas, has at the same time paved the way for a series of important works in the same line of research. Of these preparatory works I shall mention Dr. Steinthal's dissertation "On the Reciprocal Relations of Philology, History and Psychology" [*Philologie, Geschichte und Psychologie in ihren gegenseitigen Beziehungen*], delivered before the Convention of Philologists at Meissen, in the year 1863; further, his "Classification of Languages" [*Die Classification der Sprachen*]; and his "Characteristics of

the Principal Types of Language-structure" [*Characteristik der hauptsächlichsten Typen des Sprachbaues,* Berlin, 1860].

In the following remarks, in order to obtain a comprehensive survey of the historical data of the modern science of language, it will prove useful to recapitulate a few of the philological thoughts which the above works suggest to the modern student of the science of language.

Philosophy, at all times, had conceived a fictitious, *absolute* speech-form, and, hence, the *substantial unity* of all languages. From this abstract construction it followed that still in the second decade of the nineteenth century the historical grammarians had scarcely yet advanced beyond the limits which the Greeks and Romans had formerly attained. The knowledge of the historical grammarians was yet limited to the two classical languages. The classical languages were opposed to the languages of the Orient, and by these were understood only the Semitic languages, probably in deference to Old Testament literature. This narrow treatment of language, moreover, tallied with the purely external, mechanical theory of language, which also still prevailed in the second decade of the nineteenth century.

The author of this mechanical theory was Friedrich Adelung, a German scientist residing and writing in Russia. Adelung is still remembered as the author of a work entitled *Mithridates,* which he intended should be a kind of universal grammar of all languages of the globe. The classical grammar was supposed to suit the form of any national language; but even to Adelung the value of this universal grammar had no direct bearing upon the deepest problems of speech, such as the origin, nature and classification of languages. It was merely imagined to afford an external advantage, i. e., for the geographical distribution of nations; and, in harmony with the pre-

vailing philosophical systems, the author concludes that all languages are built on nearly the same plan, and that it is idle to dispute about the relative excellences of any language, because time, circumstances and civilization will improve any language. In this system there is no question of classification proper, but only of a geographical line of languages, beginning with the monosyllabic languages of Eastern Asia, and with the polysyllabic languages, extending through Central and Western Asia into Europe. Even long after Adelung's time, this is still a widely popular theory of language; and, withal, the only notion of language understood and entertained by many persons of average culture in our own day. Adelung's theory, however, could not satisfy any earnest student of language. Soon after Adelung there arose a new school of philologists, who assumed a marked antagonistic attitude toward the philosophical theories of the past. When Eichhorn proposed the genealogical grouping of languages, by including the Hebrew, with the kindred languages, there begins a new independent era of linguistic science.

This was the first step in the right direction; because the aim of modern comparative linguistics is, precisely, classification according to families and tribes of languages. Comparative linguistics of this kind, however, have their limit, and by themselves are far from sufficient; for when there has been performed the task of comparing and distributing particular languages into families of kindred tongues, these linguistic groups have yet to be characterized, according to their inward differences or diversities of form. This cannot be done through the mere proof of the affinities of these languages. The genealogical or genetic classification, nevertheless, remains the necessary basis of every attempt at a scientific classification of languages, although the genesis of languages must be rigorously kept apart from that of races and nations. From

the genesis of languages, absolutely, the origin of nations themselves can not be absolutely inferred, nor, on the other hand, does the relation of languages to ethnology represent the most important side of the science of language. Although language so long continued to be regarded as a mechanism, there appeared, as early as the first decade of the nineteenth century, a German thinker who cautiously ventured to assert that language was not merely a mechanism, but rather an *organism.* This thinker was Friedrich Schlegel. In his work: *Weisheit der Inder* ("The Wisdom of the Hindus") we find for the first time, entirely new ideas concerning the nature of language, in striking contrast with the accepted theories of the philosophers; and the Germans, accordingly, claim that with Friedrich Schlegel the modern science of language must be said to begin. Schlegel wished to classify languages, and to this end he created three main divisions: languages without inflection, agglutinative languages, and inflected languages. In the first class the particles that modify the sense stand entirely apart, i. e., they are words independent of the root. In the second (agglutinative) class, grammar is entirely made up of suffixes and prefixes, which are everywhere easily distinguishable and still preserve to some extent their original significance, such as of plural, of past or future action; and yet, these agglutinative particles have already begun to amalgamate, to coalesce with the word. Schlegel regards both these classes as inorganic and contrasts them with the third, the inflected languages, which he calls the really organic or organized class.

In Schlegel's own day these novel views signaled an important innovation in the methods of linguistic research. He had thus discovered that an enormous distance intervenes between the inflection of the Indo-European languages and the technique, or means of creating grammar,

employed by a number of other races; and he had understood that the Indo-European inflection could not be explained from any purely mechanical process. But, on the other hand, he had not attained to a clear intuition or perception of the nature of this difference. He only felt that it was the result of an inward process; but he grows vague and obscure when he seeks to explain it. Thus his conception of language assumes a mystical aspect. He maintains, for example, that in Sanskrit and in Greek each root is really what it stands for, like a living germ; but, as Dr. Steinthal remarks, to convert a mental activity into an immediate process of nature is to fall into crude mysticism.

A. W. Schlegel, Friedrich's equally distinguished brother, in his remarks on the Provençal language and literature has reproduced the aforesaid triple classification, perhaps, in a clearer form. A. W. Schlegel, within the third or inflected class, further gives an interesting sub-division which he calls synthetical and analytical languages. Synthetical languages use inflected forms where analytical languages only employ prepositions, pronouns and auxiliary verbs. The Greek and Latin are examples of the synthetical kind; while English and the languages derived from the Latin have an analytical grammar. The Teutonic languages form an intermediate class. The analytical languages have been evolved at different historical periods from the synthetical languages. A. W. Schlegel maintained that the ancient synthetical languages enjoyed a superior excellence. The highest praise that can be bestowed upon our modern languages is their perfect adaptation to the actual needs of the human mind; while the most signal advantage of the ancient classical languages consists in the much greater freedom they enjoy in the arrangement of the words within the sentence. Here, they satisfy the cravings of logic, and ensure clearness by so-

norous and accentuated inflections. Through an endless variety of phrases and by entwining words with exquisite taste, the speaker, writer, and the inspired poet, were able to impress the imagination and sensibility of others with an ever novel charm. On the other hand, the modern languages are severely bound to the rules of logic, since, while having lost the greater part of the inflections, they are compelled to designate the relations of ideas by the position, which the words occupy in the sentence. A. W. Schlegel, in conclusion, makes the following striking remarks on the synthetical languages: "They belong to another phase of the human intellect. In the synthetical languages there is revealed a more simultaneous action, and a more immediate impulse of all the faculties of the soul, than in any of our modern, analytical languages. The analytical or modern languages are controlled by reason which acts apart from the other faculties, and hence, renders a better account of their operations. I believe that in comparing the genius of antiquity with the spirit of modern times we shall discover a contrast entirely similar to that which exists between the two classes of languages. All the great creative syntheses of history were the work of a remote antiquity, while perfected analysis was reserved for modern times."

A few years later Prof. Franz Bopp successfully turned these inspired intuitions and direct perceptions of both the Schlegels into a genuine practical benefit to linguistics and philology. Professor Bopp takes Friedrich Schlegel particularly to task for his contradictions, mysticism, and, above all, for his lack of historical, *technical* knowledge of languages. Professor Bopp, in principle, readily admits Schlegel's conception of language as organism; and, as well, the scientific value of a natural classification such as Schlegel had aimed at; but thereupon Bopp himself in his monumental work, *A Comparative Grammar of*

the Indo-European Languages, furnishes an essentially modified classification: "First," he says "there are languages with *monosyllabic roots, devoid of any capacity of composition,* and hence, without organism and without grammar. To these belongs the Chinese, in which everything is still the naked root, and in which the grammatical categories, and all collateral relations, are mainly understood from the position of the roots in the sentence. Secondly: *Monosyllabic languages which are capable of composition* and which by this means almost entirely obtain their organism, their grammar. To these belong languages that have an affinity with Sanskrit, and all other languages not belonging to the first class, except the Semitic languages. The *Semitic* languages, apart, form the third class. The Semitic languages create their grammatical forms not only through composition, like the second class, but also by means of *a purely inward* modification of the roots."

From this classification it will be seen that Professor Bopp starts from the *technique* of language, that is, from the *means* by the aid of which language creates grammar, and employs it for the designation of the categories. This technical point of view henceforth constitutes the essential element which must be taken into consideration in all attempts at classification of languages. It is to Prof. Franz Bopp's enduring honor that he created the modern *historical grammar.* His linguistic and philological work has, of course, been extended and perfected by a host of later scholars; but, in the principle which pervades and controls his methods, Franz Bopp can scarcely be superseded. To the historical grammarians, accordingly, belongs the credit of having performed the main bulk of all the linguistic and philological work of the nineteenth century. From this time, the valuable creations of the modern science of language have been poured forth, every year of the cen-

tury. The true principle of linguistic research having once been discovered, the progressive advance of the science of language was no longer dependent on the duration of time. In order to obtain a survey (if only superficially) of that prodigious intellectual activity, it will suffice to glance at European linguistic catalogues, like Trübner's *Bibliotheca Sanscrita,* exclusively relating to the department of Sanskrit literature; or to turn over the leaves of such German philological reviews as the *Zeitschrift für die Kunde des Morgenlandes*; or the *Zeitschrift der deutschen morgenländischen Gesellschaft,*—every page of which casts a flood of light on the history, the religions, and the philosophical systems of every nation of Asia.

But all this arduous work performed by the historical school is far from completing the task of the science of language; because the theory of the historical school, by conceiving language as an organism, soon found it necessary to connect linguistic study with the kindred sciences of history and psychology. Language, as Dr. Steinthal observes, taken by itself and treated historically, only represents a partial, one-sided revelation of any national mind. Any purely technical investigation of language, in order to be philological and to obtain historical significance, must bring the historical evolution into contact with numerous other manifestations of the mental life of a race or nation. In this sense Grimm's *Grammar of the Germanic Languages* is quoted by Professor Steinthal as a luminous instance of a broad, philological treatment of language, because, on the one hand, Grimm limits his technical research to the historical grammar, while, on the other, he extends his investigation to all the departments of literature—to religion, jurisprudence, social institutions, to all the intellectual achievements of the Germanic nations. In this sense Grimm became the true founder of a racial, Germanic philology. But besides Grimm's Germanic philology

there are other national philologies, like those of the Romance, Slav, and other linguistic groups. The investigations of these, also, include the literatures, institutions, and the whole intellectual activity of those nations; whence it must follow that the exclusively historical method applied to each group will not be sufficient. We are prompted to a deeper study of the relations of the science to several other sciences. In a broad sense, philology thus becomes the science of the universal human mind, as manifested in the varieties and differences of all the national philologies of the globe. In order to understand and to create ideas, philology must think—must be a thinking science. Philology becomes an historical science only through combining together perception (*Anschauung*) and thinking. In philology perception and thinking in a definite form are revealed as *interpretation* and *critique*. Interpretation seeks to understand the objects of cognition, while critique measures particular objects according to universal standards by comparing, judging, and arranging the successive stages of any evolution. In this sense philology must be said to perform a double task: first, from an historical and philosophical point of view, it endeavors to understand the evolution of the universal human mind; and thereupon it applies the laws of that evolution to the phenomenon of speech, by investigating the origin and nature of language. In fact, considerable time before Franz Bopp, several European and American philologists had already undertaken to write so-called "Philosophies" of language, purporting to explain the origin and nature of language, the relations of speech to thought, to logic, and so forth. But, when we recall to mind the dualistic philosophy of the middle ages and that same dualistic tendency again, from Descartes, through Kant, to Hegel, it was to be expected that those "pseudo"-philosophies of language would result in some of the the most erratic and arbitrary elaborations

of the European mind—of that European mind which the Frenchman Rénan, perhaps too severely, has somewhere characterized as, theoretically, the most gullible among the racial minds of the globe.

Without entering into a detailed discussion of the several divergent theories, let me simply remark that in Germany the so-called "younger school" of comparative grammar, founded by Schleicher, maintains that language is purely a *natural* organism; and that the science of language belongs to natural history. This short-lived school, however, relapsed into the empty formalism which earlier had been set forth by the German philologist Becker. In this connection it may suffice to recall to mind that although Schleicher and other distinguished modern linguists (including the late Prof. Max Müller, and in America, Professor Dwight Whitney) have doubtless rendered important service to the science of language, it does not follow that they always proved to be profound or very consistent thinkers in formulating their theories on the origin and the nature of language. As regards America, such singularly one-sided treatises as Professor Whitney's *Oriental and Linguistic Studies,* and his *Study of Language,* have not failed to produce a painful impression upon the European adepts of the historical school founded by Prof. Franz Bopp. Those who may have read Dr. Steinthal's *Antikritik,* written in refutation of Professor Whitney's philological views, will easily understand the the wide divergence between American and German philological ideas. In attributing to language stratifications, phonetic decay, dialectic regeneration etc., as to a solid substance, the writers of self-styled "Philosophies" of language forgot that even Hegel himself had written in regard to Spinoza that "substance must be resolved into a process."

Among the men who in the early decades of the nine-

teenth century imparted a novel impulse to the theoretical investigation of language Wilhelm von Humboldt particularly deserves to be mentioned as one of the most original thinkers of modern times. On this occasion I can only refer to his last work about the Kawi language—an extinct language on the Island of Java. In his intensely thoughtful introduction to this work, while discussing the existing varieties of human languages, Humboldt applies to the domain of language those same ideas which he had earlier applied to the whole intellectual evolution of man. More than all others, Humboldt was impressed with the *individual* character of the evolution of the human mind. Throughout history in the laws and the institutions of the State, in the sciences and arts—everywhere he meets with individual characters, individual achievements. As a result, he views history mainly through nature's distribution of mankind into races and nations; and, moreover, he conceives each nation as a collective individual. But because national differences are most markedly expressed precisely in the forms of their respective languages, he finds it necessary to investigate also the nature of all human utterance. He regards each single language as a definite, individual expression of some national characteristic; as some exclusive, national conception of earthly existence; or, as he calls it, *"eine eigenthümliche Weltansicht."* Still, as he proceeds, Humboldt himself is forced to acknowledge that even this individual conception is yet far from satisfying the innate cravings of the human spirit. Within all men—individuals as well as nations—there exists a foreboding of the universal, a craving for totality. This obscure longing for totality immediately accompanies our sense of individuality itself; and it even grows more intense in the same ratio as our sense of individuality is strengthened. Individuals, according to Humboldt, are but the external manifestations of the particular evolutions of the

universal vital principle, or energy, which he terms *"das innere sich in seiner Fülle frei entwickelnde Lebensprincip.* But this vital principle, this center, is entirely unknown to us. The unknown, abstract totality remains but an aspiration—an unsatisfied longing. From these ideas we perceive that Humboldt himself, for a moment at least, relapses into the dualistic mysticism of the abstract "thing-in-itself."

By retaining this abstract totality, Humboldt accordingly is unable to reach an organic classification of languages, but only obtains a classification by differences of degrees. Prof. H. Steinthal, however, points out that Humboldt himself, in the progress of his deep investigation, unconsciously breaks through the dualism and solves the apparent conflict between the individual phenomenon and the craving for totality. Humboldt had remarked that in the historical evolution of the universal human mind we may discern a double kind of progress. First, there is the slow, almost mechanical advance in a straight line, as it were, in which the earlier is ever the cause of the later, the subsequent phenomenon. But from time to time, by suddenly imparting new impulse, the original, sluggish movement is not only continued forward, but accelerated and intensified; as, e. g., when within any national groups there arise more perfect laws and improved religious or social institutions—all of which things are seen throughout history to have been mainly the work of individual men of genius. These men, by their inborn creative energy and will-power, were able to transform the old elements into a more expanded human activity, no longer purely individual and local, but often of a broader or even universal value and significance.

This actually takes place within the historical evolution of languages. Humboldt asks, "who creates language?" And he answers that within the race or nation, language

is the work of all collectively, and at the same time of each single individual within the nation. But here also we find that in each nation there are periods when this collective linguistic work of the masses suddenly soars to unexpected heights, or is transformed by the higher creative energy of individual men whom we usually call men of genius. In poetry and in prose the individual efforts of these men at all times mark the creation of the national literatures of the world. The traditional elements which they employed were not strictly the causes, but merely the conditions of their creative efforts. The true causes must be sought for in their own higher creative energy or power of will which transformed the previous elements into a broader ideal for the benefit of their own people and of humanity at large.

During these creative periods of their national literatures, we thus perceive that the respective languages display indeed their most exclusive, individual, *national* forms; yet, at the same time, that both in form and contents they assume a *universal* human value and significance. It is precisely in this sense that we call the Greek and Latin the "classical" languages; and in this sense, also, the word "genius" simply means *the creative energy of individual personality rising to the heights of totality. of universality.*

The arbitrary *a priori* doctrine of the substantial unity of all languages had for ages closed to philology every avenue of thought, of critique, and the creation of new ideas. On the contrary, the modern science of language, while refraining from absolute methods, investigates language mainly as a natural psychic process. Metaphysics and logic remain the sciences of general principles; but within the domain of objective reality, of nature, the study of language, like other natural sciences, requires a special, mediating, or auxiliary science. This mediating science,

the study of language (together with philology and history) will clearly find in psychology. As the natural scientist refers the totality of natural objects to one principle, i. e., to matter, so the psychological philologist who investigates the historical evolution of the human mind refers all the forms of that manifestation to the particular principle which we call spirit, soul. Psychology above all is an experimental science and as such is not concerned about the reconciliation of matter and soul. The natural scientist understands by matter the totality of the laws which govern material phenomena; and, likewise, soul to the psychological philologist denotes the totality of the laws which control spiritual or mental manifestations. The laws the soul follows remain the same whether we prefer to regard them as the laws of certain cerebral functions, or as the laws of some immaterial soul-substance. Psychology, accordingly, is purely a mediating and auxiliary science to philology for the investigation of the laws which are discernible in the mental evolution of humanity; but, whether the origin of speech must be referred to an unconscious activity or to innate faculties, is a problem entirely apart.

The English thinker John Stuart Mill, in his *System of Logic* published in the year 1843, was one of the first to propose what he called a "Social Science"; and in the same book also a "Science of National Character." The English thinker would probably have realized his purpose, and would have opened up a much wider field of research, if he had clearly understood the relations of philology to history and to psychology, as well as the fact that in this broader sense philology *is* history. Within philology, from the point of view of the inward factors of the human mind, the history of races and of nations becomes the history of the organization of states, of national constitutions, of commerce, of private life, and of the arts. While the

outward division into races and nations marks a difference, on the other hand the mental evolution reveals a sort of unifying tendency. A higher degree of racial and national self-consciousness, therefore, becomes the true lever of history—the distinctive mark, characterizing the historical, racial and national minds, over against the stationary, non-historical and prehistorical ones. The possession of a true, historical self-consciousness requires that the respective national minds should entertain a clear notion of the world at large and of their own individual value to humanity in their pursuit of definite humanitarian aims. All this implies something more than merely a mechanical process or an enumeration of dry sociological statistics, but rather the creative stages of a mental evolution—a long series of repeated unequal efforts, which the non-historical races never have made, but which the prehistorical races attempted, at least, to realize during their prehistoric period. It was reserved for the modern science of language to construct a more solid "Science of National Character." From the middle of the past century, German philologists, and German philological reviews, have been collecting a wealth of valuable materials for this purpose, among which latter I may again mention the *Zeitschrift für Völkerpsychologie*, first edited by the Professors Steinthal and Lazarus.

* * *

In the above general survey, it was not my intention to give a complete outline of Humboldt's theory of the science of language. This would have required a lengthy investigation of the principles (*Grundsätze*) of his science of language, and a close analysis of his "speech-idea" (*die Sprachidee*, or *die Idee der Sprachvollendung*), in the elucidating and adjusting of which Dr. Steinthal has performed the arduous task of imparting a higher value to

Humboldt's original ideas. By this "speech-idea" we do not understand any attainable postulate or absolute "speech-ideal," but only the speaking-activity of mankind while striving to realize, to create language. The main task of the modern science of language will for a long time still consist in the effort to demolish *the dualistic notion of the substantial unity of languages.* Dr. Steinthal believed that this could be attained by attempting a novel classification of languages, conceived as evolution of the speech-idea. In this classification the "kosmos" of articulate sounds, of the "airy tongues" of all the races of the earth, has been distributed into thirteen classes in striking analogy with certain natural sciences.

A. H. GUNLOGSEN.

CRITICISMS AND DISCUSSIONS.

A MATHEMATICAL STUDY OF MAGIC SQUARES.

A NEW ANALYSIS.

Magic squares are not simple puzzles to be solved by the old rule of "Try and try again," but are visible results of "order" as applied to numbers. Their construction is therefore governed by laws that are as fixed and immutable as the laws of geometry.

It will be the object of this essay to investigate these laws, and evolve certain rules therefrom. Many rules have already been published by which various magic squares may be constructed, but they do not seem to cover the ground comprehensively. It is the belief of the writer that the rules herein given will be competent to produce all forms of 3×3 and 4×4 squares with their compounds, and

a	b	c
d	e	g
h	m	n

Fig. 1.

$x+2y$	x	$x+y$
$x-y$	x	$x+y$
x	$x-2y$	$x-y$

Fig. 2.

8	1	6
3	5	7
4	9	2

Fig. 3.

23	2	20
12	15	18
10	28	7

Fig. 4.

also that the principles enunciated will apply largely to all other magic squares.

Let Fig. 1 represent a 3×3 magic square. By inspection we note that:

$$h+c=b+m$$
$$\text{and } h+m=g+c$$
$$\text{therefore } 2h=b+g$$

In this way four equations may be evolved as follows:

$$2h=b+g$$
$$2n=b+d$$

$$2c = d + m$$
$$2a = m + g$$

It will be seen that the first terms of these equations are the quantities which occur in the four corner cells, and therefore that the quantity in each corner cell is a mean between the two quantities in the two opposite cells that are located in the middle of the outside rows. It is therefore evident that the least quantity in the magic square must occupy a middle cell in one of the four outside rows, and that it cannot occupy a corner cell.

Since the middle cell of an outside row must be occupied by the least quantity, and since any of these cells may be made the middle cell of the upper row by rotating the square, we may consider this cell to be so occupied.

Having thus located the least quantity in the square it is plain that the next higher quantity must be placed in one of the lower corner cells, and since a simple reflection in a mirror would reverse the position of the lower corner cells, it follows that the second smallest quantity may occupy *either* of these corner cells. Next we may write more equations as follows:

$$a + e + n = S \text{ (or summation)}$$
$$d + e + g = S$$
$$h + e + c = S$$

also

$$a + d + h = S$$
$$n + g + c = S$$

therefore

$$3e = S$$

and

$$e = S/3$$

Hence the quantity in the central cell is an arithmetical mean between any two quantities with which it forms a straight row or column.

With these facts in view a magic square may now be constructed as shown in Fig. 2.

Let x, representing the least quantity, be placed in the middle upper cell, and $x + y$ in the lower right-hand corner cell, y being the increment over x.

Since $x + y$ is the mean between x and the quantity in the left-hand central cell, this cell must evidently contain $x + 2y$.

Now writing $x + v$ in the lower left-hand corner cell, (con-

sidering v as the increment over x) it follows that the central right-hand cell must contain $x + 2v$.

Next, as the quantity in the central cell in the square is a mean between $x + 2y$ and $x + 2v$, it must be filled with $x + v + y$. It now follows that the lower central cell must contain $x + 2v + 2y$, and the upper left-hand corner cell $x + 2v + y$, and finally the upper right-hand corner cell must contain $x + v + 2y$, thus completing the square which necessarily must have magic qualifications with any conceivable values which may be assigned to x, v, and y.

We may now proceed to give values to x, v, and y which will produce a 3×3 magic square containing the numbers 1 to 9 inclusive in arithmetical progression. Evidently x must equal 1, and as there must be a number 2, either v or y must equal 1 also.

Assuming $y = 1$, if $v = 1$ or 2, duplicate numbers would result, therefore v must equal at *least* 3.

In the square under consideration the central number must be 5 and as this number is composed of $x + y + v$, therefore v must equal 3. Using these values, viz., $x = 1$, $y = 1$ and $v = 3$, the familiar 3×3 magic square shown in Fig. 3 is produced.

It is important to recognize the fact that although in Fig. 3 the series of numbers used has an initial number of 1, and also a constant increment of 1, yet this may be considered as only an accidental feature pertaining to this particular square, the real fact being that *a magic square of* 3×3 *is always composed of three sets of three numbers each.* The difference between the numbers of each trio is uniform, but the difference between the last term of one trio and the first term of the next trio is not necessarily the same as the difference between the numbers of the trios.

For example, if $x = 2$, $y = 5$ and $v = 8$, the resulting square will be as shown in Fig. 4.

The trios in this square are as follows:

$$2 — 7 — 12$$
$$10 — 15 — 20$$
$$18 — 23 — 28$$

The difference between the numbers of these trios is $y = 5$, and the difference between the homologous numbers is $v = 8$.

A recognition of these two sets of increments is essential to the proper understanding of the magic square. Their existence is masked in the 3×3 square shown in Fig. 3 by the more or less accidental quality that in this particular square the difference between ad-

$x\ 2s\ t\ 2v\ y$	$2\ x\ s\ t$	$x\ 2s\ t\ v\ 2y$	$x\ 2v\ y$	x	$x\ v\ 2y$	$x\ s\ 2t\ 2v\ y$	$x\ s\ 2t$	$x\ s\ 2t\ v\ 2y$
$x\ 2s\ t\ 2y$	$2\ x\ s\ t\ v\ y$	$x\ 2s\ t\ 2v$	$x\ 2y$	$x\ v\ y$	$x\ 2v$	$x\ s\ 2t\ 2y$	$x\ s\ 2t\ y$	$x\ s\ 2t\ 2v$
$2\ x\ s\ t\ v$	$x\ 2s\ t\ 2v\ 2y$	$x\ 2s\ t\ y$	$x\ v$	$x\ 2y\ 2v$	$x\ y$	$x\ s\ 2t\ v$	$x\ s\ 2t\ 2v\ 2y$	$x\ s\ 2t\ y$
$x\ 2t\ 2v\ y$	$x\ 2t$	$x\ 2t\ v\ 2y$	$x\ s\ t\ 2v\ y$	$x\ s\ t$	$x\ s\ t\ v\ 2y$	$x\ 2s\ 2v\ y$	$x\ 2s$	$x\ 2s\ v\ 2y$
$x\ 2t\ 2y$	$x\ 2t\ v\ y$	$x\ 2t\ 2v$	$x\ s\ t\ 2y$	$x\ s\ t\ v\ y$	$x\ s\ t\ 2v$	$x\ 2s\ 2y$	$x\ 2s\ v\ y$	$x\ 2s\ 2v$
$x\ 2t\ v$	$x\ 2t\ 2v\ 2y$	$x\ 2t\ y$	$x\ s\ t\ v$	$x\ s\ t\ 2v\ 2y$	$x\ s\ t\ y$	$x\ 2s\ v$	$x\ 2s\ 2v\ 2y$	$x\ 2s\ y$
$x\ s\ 2v\ y$	$x\ s$	$x\ s\ v\ 2y$	$x\ 2s\ 2t\ 2v\ y$	$x\ 2s\ 2t$	$x\ 2s\ 2t\ v\ 2y$	$x\ t\ 2v\ y$	$x\ t$	$x\ t\ v\ 2y$
$x\ s\ 2y$	$x\ s\ v\ y$	$x\ s\ 2v$	$x\ 2s\ 2t\ 2y$	$x\ 2s\ 2t\ v\ y$	$x\ 2s\ 2t\ 2v$	$x\ t\ 2y$	$x\ t\ v\ y$	$x\ t\ 2v$
$x\ s\ v$	$x\ s\ 2v\ 2y$	$x\ s\ y$	$x\ 2s\ 2t\ v$	$x\ 2s\ 2t\ 2v\ 2y$	$x\ 2s\ 2t\ y$	$x\ t\ v$	$x\ t\ 2v\ 2y$	$x\ t\ y$

Fig. 5.

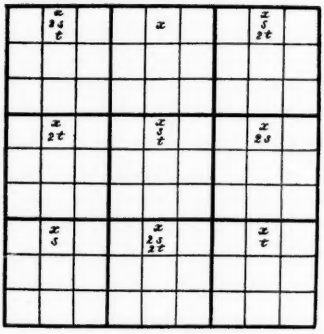

Fig. 6.

jacent numbers is always 1. Nevertheless the square given in Fig. 3 is really made up of three trios, as follows:

1st trio 1 — 2 — 3
2nd " 4 — 5 — 6
3rd " 7 — 8 — 9

in which the difference between the numbers of the trios is $y = 1$, and the difference between the homologous numbers is $v = 3$. Furthermore it is simply an *accidental* quality of this particular square that the difference between the last term of a trio and the first term of the next trio is 1.

Having thus acquired a clear conception of the structure of a 3×3 magic square, we are in a position to examine a 9×9 compound square intelligently, this square being only an expansion of the 3×3 square, and governed by the same constructive rules.

Referring to Fig. 6 the upper middle cells of the nine subsquares may first be filled in the same way that the nine cells in Fig. 2 were filled, using for this purpose the terms, x, t, and s. Using these as the initial terms of the subsquares the square may then be completed, using y as the increment between the terms of each trio, and v as the increment between the homologous terms of the trios. The result is shown in Fig. 5, *in which the assignment of any values to x, y, v, t and s, will yield a perfect, compound* 9×9 *square.*

Values may now be assigned to x, y, v, t and s which will produce the series 1 to 81 inclusive. As stated before in connection with the 3×3 square, x must naturally equal 1, and in order to produce 2, one of the remaining symbols must equal 1. In order to avoid duplicates, the next larger number must at least equal 3, and by the same process the next must not be less than 9 and the remaining one not less than 27. Because $1 + 1 + 3 + 9 + 27 = 41$, which is the middle number of the series 1 — 81, therefore just these values must be assigned to the five symbols used in the construction of the square. The only symbol whose value is fixed, however, is x, the other four symbols may have the values 1 — 3 — 9 or 27 assigned to them indiscriminately, thus producing all the possible variations of a 9×9 compound magic square.

If v is first made 1 and $y = 2$, and afterwards y is made 1 and $v = 2$, the resulting squares will be simply reflections of each other, etc. Six fundamental forms of 9×9 compound magic squares may be constructed as shown in Figs. 7, 8, and 9.

71	64	69	8	1	6	53	46	51
66	68	70	3	5	7	48	50	52
67	72	65	4	9	2	49	54	47
26	19	24	44	37	42	62	55	60
21	23	25	39	41	43	57	59	61
22	27	20	40	45	38	58	63	56
35	28	33	80	73	78	17	10	15
30	32	34	75	77	79	12	14	16
31	36	29	76	81	74	13	18	11

71	8	53	64	1	46	69	6	51
26	44	62	19	37	55	24	42	60
35	80	17	28	73	10	33	78	15
66	3	48	68	5	50	70	7	52
21	39	57	23	41	59	25	43	61
30	75	12	32	77	14	34	79	16
67	4	49	72	9	54	65	2	47
22	40	58	27	45	63	20	38	56
31	76	13	36	81	18	29	74	11

Fig. 7.

77	22	51	56	1	30	71	16	45
24	30	76	3	29	55	18	44	70
49	78	23	28	57	2	43	72	17
62	7	36	68	13	42	74	19	48
9	35	61	15	41	67	21	47	73
34	63	8	40	69	14	46	75	20
65	10	39	80	25	54	59	4	33
12	38	64	27	53	79	6	32	58
37	66	11	52	81	26	31	60	5

77	56	71	22	1	16	51	30	45
62	68	74	7	13	19	36	42	48
65	80	59	10	25	4	39	54	33
24	3	18	50	29	44	76	55	70
9	15	21	35	41	47	61	67	73
12	27	6	38	53	32	64	79	58
49	28	43	78	57	72	23	2	17
34	40	46	63	69	75	8	14	20
37	52	31	66	81	60	11	26	5

Fig. 8.

77	58	69	20	1	12	53	34	45
60	68	76	3	11	19	36	44	52
67	78	59	10	21	2	43	54	35
26	7	18	50	31	42	74	55	66
9	17	25	33	41	49	57	65	73
16	27	8	40	51	32	64	75	56
47	28	39	80	61	72	23	4	15
30	38	46	63	71	79	6	14	22
37	48	29	70	81	62	13	24	5

77	20	53	58	1	34	69	12	45
26	50	74	7	31	55	18	42	66
47	80	23	28	61	4	39	72	15
60	3	36	68	11	44	76	19	52
9	33	57	17	41	65	25	49	73
30	63	6	38	71	14	46	79	22
67	10	43	78	21	54	59	2	35
16	40	64	27	51	75	8	32	56
37	70	13	48	81	24	29	62	5

Fig. 9.

It will be noted that these are arranged in three groups of two squares each on account of the curious fact that the squares in each pair are mutually convertible into each other by the following process:

If the homologous cells of each 3×3 subsquare be taken in the order as they occur in the 9×9 square, and a 3×3 square made therefrom, a new magic 3×3 square will result. And if this process is followed with all the cells and the resulting nine 3×3 squares are arranged in magic square order a new 9×9 compound square will result.

For example, referring to the upper square in Fig. 7, if the numbers in the central cells of the nine 3×3 subsquares are arranged in magic square order, the resulting square will be the central 3×3 square in the lower 9×9 square in Fig. 7. This law holds good in each of the three groups of two squares (Figs. 7, 8 and 9) and no fundamental forms other than these can be constructed.

a	b	c	d
g	h	n	m
n	o	p	s
t	r	x	y

Fig. 10.

a_x			a_r
			b_x
			c_x
g_x	a_y	a_t	g_r

Fig. 11.

a_x	g_y	g_t	a_r
b_r	c_t	c_y	b_x
c_r	b_t	b_y	c_x
g_x	a_y	a_t	g_r

Fig. 12,

1	8	12	13
14	11	7	2
15	10	6	3
4	5	9	16

Fig. 13.

The question may be asked: How many variations of 9×9 compound magic squares can be made? Since each subsquare may assume any of eight aspects without disturbing the general order of the complete square, and since there are six radically different, or fundamental forms obtainable, the number of possible variations is 6×8^9!

We may now proceed to analyze the construction of a 4×4 magic square as represented in Fig. 10. From our knowledge of this square and its qualifications we are enabled to write four equations as follows:

$$a + h + p + y = S \text{ (Summation)}$$
$$g + h + n + m = S$$
$$n + o + p + s = S$$
$$t + o + n + d = S$$

By inspection of Fig. 10 it is seen that the sum of the initial

terms of these four equations equals S, and likewise that the sum of their final terms also equals S. Hence $h+n+o+p=S$. It therefore follows:

1st. That *the sum of the terms contained in the inside* 2×2 *square of a* 4×4 *square is equal to* S.

2d. Because the middle terms of the two diagonal columns compose this inside 2×2 square, their end terms, or *the terms in the four corner cells of the* 4×4 *square must also equal* S, or:

$$a+d+t+y=S$$

3d. Because the two middle terms of each of the two inside columns (either horizontal or perpendicular) also compose the central 2×2 square, *their four end terms must likewise equal* S.

4th. We may now write the following equations:

$$b+c+v+x=S$$
$$b+c+a+d=S$$

therefore

$$a+d=v+x,$$

which shows that *the sum of the terms in any two contiguous corner cells is equal to the sum of the terms in the two middle cells in the opposite outside column.*

5th. Because

$$g+h+n+m=S$$

and

$$o+h+n+p=S$$

it follows that

$$g+m=o+p$$

or, that *the sum of the two end terms of any inside column,* (either horizontal or perpendicular) *is equal to the sum of the two middle terms in the other parallel column.*

6th. Since

$$t+o+n+d=S$$

and

$$h+o+n+p=S$$

therefore

$$t+d=h+p$$

or *the sum of the two end terms of a diagonal column is equal to the sum of the two inside terms of the other diagonal column.*

These six laws govern *all* 4×4 magic squares whether they

are perfect or imperfect, but perfect 4×4 squares also possess the additional feature that the sum of the numbers in any two cells that are equally distant from the center and symmetrically opposite to each other in the square equals $S/2$.

With these rules before us we may now construct a perfect 4×4 magic square. Referring to Fig. 11, in the upper left-hand corner cell we will place a number which may be represented by $a + x$, and in the right-hand upper corner a number represented by $a + v$. Also in the central cells of the lower row we will write numbers represented respectively by $a + y$ and $a + t$. Then in the lower left-hand cell we will place a number represented by $g + x$, and in the central cells of the outer right-hand column numbers represented respectively by $b + x$ and $c + x$, and because the square is to be perfect, we must write in the lower right-hand corner a number represented by $g + v$.

The unfinished perfect 4×4 square thus made may now be studied by the light of the laws previously given.

By inspection we see that

$$a + g = b + c$$

and

$$x + v = y + t$$

We also see that the central cells of the upper row should be occupied by the symbol g together with x and v, by law 4, but if thus occupied, duplicate numbers would result.

It has, however, been just shown that

$$x + v = y + t$$

and therefore g may be combined with y and t, *thus producing diverse numbers, and still remaining correct in summation.*

Seeing that the square is to be perfect, the cell which is symmetrically opposite to that occupied by $a + y$, must be filled by a number which will produce with $a + y$, a number equal to $(a + x) + (g + v)$, which will be $g + t$, because

$$x + v = y + t$$

In the same way the next cell to the left must be filled with $g + y$, and we may similarly fill the two inner cells of the left-hand outer column with $b + v$ and $c + v$.

By like simple calculations all the remaining empty cells may be filled, thus completing the 4×4 square shown in Fig. 12.

We will now proceed to show what numbers may be assigned to the eight symbols used in Fig. 12 to produce a perfect 4×4 magic square containing the numbers 1 to 16.

It is evident that some pair of symbols must equal 1 and therefore that one of the two symbols must equal 1 and the other must equal 0, (minus and fractional quantities being excluded).

It is also evident that because $a + g = b + c$, if a is the *smallest* number in the series, g must be the *largest*, and therefore the four numbers represented by a, b, c, g must form a series in which the means equal the extremes. In like manner x, y, t, v must also form another similar series.

Supposing now that $x = 1$ and $a = 0$, then $g + v$ must equal 16, and since b and c are *each less* than g, and must be also *diverse from each other*, we find that g *cannot be less than* 3. Supposing therefore that $g = 3$, then because $a + g = 3 = b + c$, it is evident that b must equal 1 (or 2) and c must equal 2 (or 1). The four quantities a, b, c, g may therefore be assigned values as given below.

$a = 0$	$x = 1$
$b = 1$	$y = 5$
$c = 2$	$t = 9$
$g = 3$	$v = 13$

As $g + v = 16$, v must equal 13 and $y + t$ must equal 14. By inspection it is seen that either y or t must equal 5, and assigning this number to y, t becomes 9, or vice versa.

With these values assigned to the symbols, Fig. 12 will develop the perfect 4×4 square shown in Fig. 13.

The possible number of diverse 4×4 magic squares which may be constructed using the numbers 1 to 16 inclusive has been variously estimated by different writers, 880 changes having been heretofore considered the maximum number. It can however be easily proven that no less than 4352 of these squares may be constructed, which will be demonstrated under the next heading.

A STUDY OF THE POSSIBLE NUMBER OF VARIATIONS IN MAGIC SQUARES.

It has been shown in connection with the 3×3 magic square that there is only one possible arrangement of nine different numbers, which will constitute a magic square.

The 4×4 and all larger squares may however be constructed

in great variety, their number of diverse forms increasing in an immense ratio with every increase in the size of square.

Beginning with the 4×4 square, in order to solve the problem of the possible number of variations that may be constructed with the numbers 1 to 16 inclusive, it will be necessary to consider the relative properties of its component elements, which may be conveniently expressed as follows, although there are several other sets of eight numbers whose combinations will yield similar results.

$$\begin{array}{ll} a = 1 & x = 0 \\ b = 2 & y = 4 \\ c = 3 & t = 8 \\ g = 4 & v = 12 \end{array}$$

As previously stated, it will be seen that

$$a + g = b + c$$
$$\text{and } x + v = y + t.$$

In consequence of this law we find that a column in a 4×4 magic square may contain each of the eight qualities once (as in the diagonal rows of square shown in Fig. 12). In other cases a pair of elements may be lacking, but be represented by another pair, the latter being repeated in the column, (as shown in the two outer vertical columns of Fig. 12). This ability to duplicate some of the elements in place of others that are omitted leads to an enormous amplification of the number of possible variations.

If all the cells in any column are filled, (or any set of four cells, the summation of which is equal to a column) the remainder of the square may then be completed by the rules previously given. This column may therefore be termed a "basic" row or column.

There are four plans by which a basic row may be filled, thus making four classes of squares which may be called Classes, I, II, III and IV.

For the sake of brevity, the symbols *a*, *b*, *c* and *g* will be termed the "*a*" elements, and *x*, *y*, *t* and *v* the "*x*" elements.

Class I includes those squares in which the basic row is made up of all of the eight elements used once each.

Class II includes those squares in which one of the elements used in the first cell of the basic row is also used in the second cell.

Class III includes those squares in which an element of the first cell in the basic row is also used in the third cell.

Class IV includes those squares in which elements of the first cell in the basic row are also used in the second and third cells.

Class I may be further divided into three Genera as follows:

Genus A comprises those squares in which neither the outer nor inner pair of cells contain either a mean or an extreme pair of "*a*" or "*x*" elements. Fig. 14 represents a basic row of Class I, Genus A.

Genus B comprises those squares in which both the inner and outer pair of cells of the basic row contain a pair of elements as shown in Fig. 15 in which the outer cells contain a pair of "*a*" elements (*a* and *g*) and the inner cells also contain a pair of "*a*" elements (*b* and *c*).

Genus C comprises those squares in which both pairs of cells

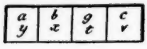

Fig. 14.

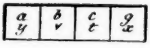

Fig. 15.

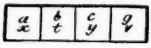

Fig. 16.

contain two pairs of elements each, as for example when the two outer cells contain *a* and *g*, and *x* and *v*, and the two inner cells contain *b* and *c*, and *t* and *y*, as shown in Fig. 16.

Classes II, III, and IV have but one genus each, and there are consequently in all, six different types. To determine the number of specimens which each genus will yield, we will now expand a basic row into a complete square.

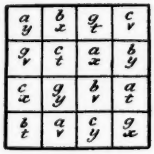

Fig. 17.

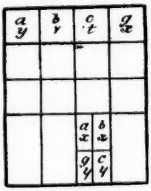

Fig. 18.

Fig. 17 shows a 4×4 square in the upper row of which the elements are written as previously given under Class I, Genus A. Filling the inner pair of cells in the lower row we see that these cells must contain $a + v$ and $c + y$, but we have the *choice* of writing $c + y$ in the right or left-hand cell. Choosing the right-hand cell the square is then completed by the laws previously given, and but slight attention is required to show that the contents of each cell is *forced* by these laws.

This square will be magic for any values assigned to the ele-

ments, and it will be normal if they are given the values 1, 2, 3, 4 and 0, 4, 8, 12.

To find the number of *possible* squares of the above class and genus we reflect that for the first cell we have a choice of 16. For the fourth cell we have a choice of only 4, since in the example, having used a and y in the first cell we are debarred from using either a, y, g or t in the fourth cell. Next, for the two central cells, we evidently have a choice of 4, and in completing the square we have the choice of *two* methods to fill the lower row. Multiplying the number of *choices* we have

$$16 \times 4 \times 4 \times 2 = 512.$$

and it is therefore clear that Class I, Genus A will yield 512 possible forms of squares.

Fig. 18 shows a square in which the basic row of elements are arranged so as to produce Class I Genus B. In filling the central cells of the lower row, it is found that the equivalent of $(a + y) + (g + x)$ must be used, and there are three such equivalents, viz.,

$$(1)\ (a + x) + (g + y)$$
$$(2)\ (b + x) + (c + y)$$
$$(3)\ (b + y) + (c + x).$$

(3) however will be found impossible, leaving only (1) and (2) available. Choosing (1) it will be seen that there are two choices since $a + x$ may be located in either the right or left-hand of the two cells. Similarly if (2) is chosen, $b + x$ may be placed in either of these cells. Hence in, say, the right-hand central lower cell, there may be placed:

$$(1)\ a + x$$
$$(2)\ g + y$$
$$(3)\ b + x$$
$$(4)\ c + y$$

as shown in Fig. 18, and when one of these four pairs of elements is used the remainder of the square becomes fixed. It therefore follows that for the first cell of the basic row there is a choice of 16. For the fourth cell of same row there is a choice of 4. For the central cells of same row there is a choice of 4 and for the lower row there is a choice of 4. Multiplying these choices together we have

$$16 \times 4 \times 4 \times 4 = 1024.$$

which is the possible number of variations of Class I, Genus B.

Writing a basic row of Class I, Genus C as given in Fig. 16, we find that the equivalents of $(a+x)+(g+v)$ must be used to fill the central cells of the lower row. Because

$$a+g=b+c$$
$$\text{and } x+v=t+y$$

there are no less than sixteen pairs which may be made all equal to each other. Ten of these pairs however will be found unavailable, leaving six pairs to choose from, and since each of these six pairs may be located in either of the two cells, there is a choice of 12 different ways in which the lower row may be filled.

For the first cell of the basic row, there is naturally a choice of 16. For the fourth cell of the same row there is no choice, as this cell must be filled with the complements of the first cell. For the two middle cells of the basic row there is a choice of 4. Multiplying these choices together we have:

$$16\times 4\times 12=768,$$

which is the possible number of variations of Class I, Genus C.

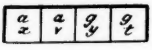

Fig 19.

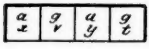

Fig. 20.

Proceeding now to Class II, a basic row may be formed as given in Fig. 19. It is evident that neither a nor g can be used in the lower row of the square, but as equivalents of

$$(a+v)+(g+y)$$

we may use either of the two couples:

$$(c+y)+(b+v)$$
$$(b+y)+(c+v),$$

and since either couple may be placed in either of two cells, there is a choice of 4 variations. To form the basic row, we have for the first cell a choice of 16 as before. For the fourth cell there is a choice of 6 seeing that one of the elements of the first cell must be located therein, coupled with any one of the three remaining elements of the opposite group. For the two inner cells there is a choice of 2. Hence for Class II we have:

$$16\times 6\times 2\times 4=768 \text{ varieties.}$$

Class III has a basic row constituted as shown in Fig. 20. It will be found impossible to construct a magic square from the above basic row along the lines hitherto followed. Nevertheless, four varieties of squares may be constructed on every basic row of this class, on account of certain relations between the two groups of elements which have not as yet been considered. The squares may be made as herein before shown, but when completed they appear to be imperfect, as will be seen in Figs. 21, 22, 23, and 24 which

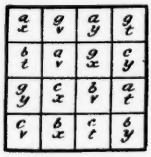

Fig. 21.

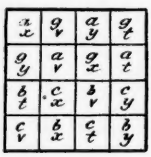

Fig. 22.

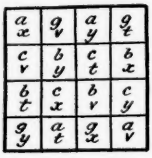

Fig. 23.

Fig. 24.

illustrate four squares built up on the foregoing basic row. These squares although seemingly imperfect, are not actually so on account of a peculiar relationship between the numbers 1, 2, 3, 4 and 0, 4, 8, 12.

Class III has for the first cell of the basic row a choice of 16, for the third cell a choice of 6, for the second cell a choice of 2, and of each of the above forms there are 4 variations. Hence we have:

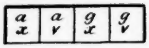

Fig. 25.

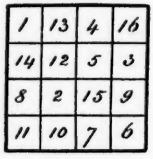

Fig. 26.

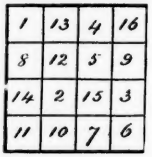

Fig. 27.

$$16 \times 6 \times 2 \times 4 = 768 \text{ varieties}$$

in this class.

Class IV has a basic row as shown in Fig. 25, and the two middle cells of the lower row may be filled with either of the two couples

$$(b + t) + (c + y)$$
$$\text{or } (b + y) + (c + t)$$

thus permitting a choice of 4. Having a choice of 16 for the first

cell of the basic row, and a choice of 4 for the two inner cells of this row, we have as a total:

$$16 \times 4 \times 4 = 256.$$

This square however has a peculiar property, owing to each couple of cells containing a pair of elements, which permits two variants to be made after each sub-basic row has been fixed. This property is illustrated in Figs. 26 and 27, in which both of the upper and lower rows are alike, and yet the squares are diverse. For class IV we therefore have:

$$256 \times 2 = 512 \text{ varieties.}$$

Summarizing the preceding results it will be seen that there are in

Class	I,	Genus	A,	512 varieties
"	I,	"	B,	1024 "
"	I,	"	C,	768 "
"	II,			768 "
"	II,			768 "
"	III,			768 "
"	IV,			512 "
			Total	4352 varieties.

There are thus at least 4352 diverse forms of 4×4 magic squares which may be constructed with the numbers 1 to 16.

Passing on to the 5×5 square, its analysis may be omitted, as the principles that underlie the formation of the 3×3 and 4×4 squares also enter largely into the formation of this and all other squares.

It may therefore be taken for granted that the components may be formed by the successive addition of five qualities in one group to the five qualities in another group.

In order that the 5×5 square may consist of the numbers 1 to 25 inclusive, the following values may be assigned to the respective symbols:

$a = 0$	$x = 1$
$b = 1$	$y = 6$
$c = 2$	$t = 11$
$d = 3$	$s = 16$
$g = 4$	$v = 21.$

Other values might be used but the foregoing are probably best adapted for general purposes.

A brief study of this square will indicate that the basic row may be constructed in a very large number of different ways.

For the first cell there is a choice of 25 combinations of elements, for the second cell 16, for the third 9, for the fourth, 4, while for the fifth there is naturally no choice, there being only one available combination left. We therefore have at the very least

$$25 \times 16 \times 9 \times 4 = 14400$$

possible variations in the basic row of this square.

To complete the square, there are at least three available plans, and the resulting squares may be designated as Classes I, II and III respectively.

Class I is made by writing the symbols of the "a" group of elements in diagonal columns across the square, in one direction, say from left to right, and the symbols of the "x" group also in diagonal columns, but in the opposite direction as shown in Fig. 28.

a x	b y	c t	d s	g v
b v	c x	d y	g t	a s
c s	d v	g x	a y	b t
d t	g s	a v	b x	c y
g y	a t	b s	c v	d x

Fig. 28.

b v				
		b	v	
	v			b
	b			v
		v	b	

Fig. 29.

a x				b v
	x	a	a'	
	a'	x		a
	a		x	a'
		a'	a	x

Fig. 30.

It will be seen that the "a" elements occupy the right-hand diagonal columns and the "x" elements the left-hand diagonal columns. It is also evident that irrespective of the way in which the basic row may be filled, the square may be completed by making "a" or "x" elements occupy either the right or left-hand diagonal column, and hence there is a choice of *two* methods; in the one case, the center cell being filled with $a + v$, and in the other (as shown in Fig. 28) it is filled with $g + x$.

Class II. The Squares in this class are constructed by making the elements in the basic row move by "knight's moves." For example, if the left-hand corner cell of the basic row contains the symbols of $b + v$, these symbols (and also all the other components of the basic row) may assume the relative positions shown in Fig. 29. It is clear that in this case there is the option of exchanging the places of $b + v$ throughout the square, thus giving a choice of *two* ways.

Class III is made by combining the method of Class I with that of Class II as shown in Fig. 30. One element (and naturally all of its fellows in the group) runs diagonally while the other element is placed by knight's moves. There is consequently a choice of *two* elements, either of which may dominate the diagonals or be located by knight's moves. In the case shown in Fig. 30 it is evident that "a" may occupy the cells marked "a" or those marked "a^1," there being eight possible knight's moves from any cell. This fact gives still another choice of two different ways, so there is a choice of *four* methods in Class III.

Summarizing the foregoing results:

For the basic row there is a choice of 14400.

For Class I squares $2 \times 14400 = 28800$
For Class II squares $2 \times 14400 = 28800$
For Class III squares $4 \times 14400 = 57600$

115200.

So there are at least 115200 different ways in which a perfect 5×5 square may be made.

According to the figures herein given the number of variations of the different sizes of squares that have been considered increases as follows:

3×3	square	1
4×4	"	4,352
5×5	"	115,200.

NOTES ON NUMBER SERIES USED IN THE CONSTRUCTION OF MAGIC SQUARES.

It has long been known that magic squares may be constructed from a series of numbers which do not progress in arithmetical order. Experiment will show, however, that any haphazard series cannot be used for this purpose, but that a definite order of sequence is necessary which will entail certain relationships between different members of the series. It will therefore be our endeavor in the present article to determine these relationships and express the same in definite terms.

Let Fig. 31 represent a magic square of 4×4. By rule No. 4 in the "New Analysis of Magic Squares" it is seen that "*the sum of the terms in any two contiguous corner cells is equal to the sum of*

the terms in the two middle cells in the opposite outside column." Therefore, in Fig. 31, $a + d = v + s$, and it therefore follows that $a - v = s - d$. In other words, these four quantities form a group with the interrelationship as shown. By the same rule (No. 4) it is also seen that $a + t = l + p$, and hence also, $a - l = p - t$, giving another group of four numbers having the same form of interrelationship, and since both groups have "a" as an initial number, it is evident that the increment used in one of these groups must be different from that used in the other, or duplicate numbers would result. It therefore follows that the numbers composing a magic square are not made up of a single group, but necessarily of more than one group.

Since we have seen that the term "a" forms a part of two groups, we may write both groups as shown in Fig. 32, one horizontally and the other perpendicularly.

Next, by rule No. 5, it is shown that *"the sum of the two end*

a	b	c	d
g	h	k	l
m	n	o	p
t	v	s	y

Fig. 31.

$a - v = s - d$
l
p
t

Fig. 32.

$a - v = s - d$
$l \quad o$
$p \quad k$
$t \quad b$

Fig. 33.

$a - v = s - d$
$l - o = n - g$
$p \quad k$
$t \quad b$

Fig. 34.

terms of any inside column (either horizontal or perpendicular) is equal to the sum of the two middle terms in the other parallel column." It therefore follows that $v + b = k + o$ or $v - o = k - b$. Using the term v as the initial number, we write this series perpendicularly as shown in Fig. 33. In the same way it is seen that $l + g = n + o$, or $l - o = n - g$, thus forming the second horizontal column in the square (Fig. 34). Next $p + m = h + k$ or $p - k = h - m$, forming the third horizontal column and in this simple manner the square may be completed as shown in Fig. 35.

It is therefore evident that a 4×4 magic square may be formed of any series of numbers whose interrelations are such as to permit them to be placed as shown in Fig. 35.

The numbers 1 to 16 may be so placed in a great variety of ways, but the fact must not be lost sight of that, as far as the construction of magic squares is concerned, they only *incidentally* possess the quality of being a single series in straight arithmetical

order, being really composed of as many groups as there are cells in a column of the square. Unless this fact is remembered, a clear conception of the quantities of the series cannot be formed.

In illustration of the above remarks, three diagrams are given in Figs. 36, 37 and 38. Figs. 36 and 37 show arrangements of the numbers 1 to 16 from which the diverse squares Figs. 39 and 40 are formed by the usual method of construction.

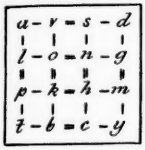

Fig. 35.

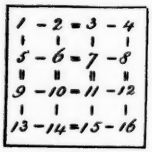

Fig. 36.

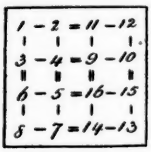

Fig. 37.

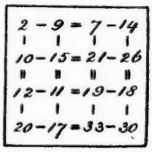

Fig. 38.

Fig. 38 shows the arrangement of an irregular series of sixteen numbers, which, when placed in the order of magnitude run as follows:

2-7-9-10-11-12-14-15-17-18-19-20-21-26-30-33

The magic square formed from this series is given in Fig. 41.

In the study of these number series the natural question presents itself: *Can as many diverse squares be formed from one series as from another?* This question opens up a wide and but little explored region as to the diverse constitution of magic squares. This

1	14	15	4
8	11	10	5
12	7	6	9
13	2	3	16

Fig. 39.

1	7	14	12
10	16	5	3
15	9	4	6
8	2	11	13

Fig. 40.

2	17	33	14
26	19	11	10
15	21	15	12
20	9	7	30

Fig. 41.

1	11	6	16
14	13	4	3
7	2	15	10
12	8	9	5

Fig. 42.

idea can therefore be merely touched upon in the present article, examples of several different plans of construction being given in illustration and the field left at present to other explorers.

Three examples will be given, the first being what is sometimes termed a "perfect" square, or one in which any two numbers that are geometrically opposite and equidistant from the center of the square will be equal in summation to any other pair of numbers so

situated. The second example will be a square in which the sum of every diagonal of the four sub-squares of 2×2 is equal, and the third example will be a square in which the pairs of numbers having similar summations are arranged symmetrically in relation to a perpendicular line through the center of the square. Figs. 39, 40 and 42 illustrate these three examples of squares.

Returning now to the question previously given, but little reflection is required to show that it must be answered in the negative for the following reasons. Fig. 41 represents a magic square having

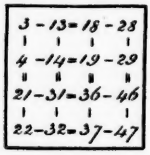

Fig. 41.

3	32	37	28
29	36	31	4
46	19	14	21
22	13	18	47

Fig. 42.

no special qualities excepting that the columns, horizontal, perpendicular and diagonal all have the same summation, viz., 66. Hence *any* series of numbers that can be arranged as shown in Fig. 35 will yield magic squares as outlined. But that it shall also produce squares having the qualifications that are termed "perfect," may or may not be the case accordingly as the series may or may not be capable of still further arrangement.

1	4	7	10	13
8	11	14	17	20
15	18	21	24	27
22	25	28	31	34
29	32	35	38	41

Fig. 43.

25	38	1	14	27
35	13	11	24	22
10	8	21	34	32
20	18	31	29	7
15	28	41	4	17

Fig. 44.

Referring to Fig. 31, if we amend our definition by now calling it a "perfect" square, we shall at once introduce the following continuous equation:

$$a+y=h+o=t+d=n+k=b+s=c+v=g+p=m+l,$$

and if we make our diagram of magic square producing numbers conform to these new requirements, the number of groups will at once be greatly curtailed.

The multiplicity of algebraical signs necessary in our amended diagram is so great that it can only be studied in detail, the complete diagram being a network of minus and equality signs.

The result will therefore only be given here, formulated in the following laws which apply in large measure to all "perfect" squares.

I. Perfect magic squares are made of as many series or groups of numbers as there are cells in a column.

II. Each series or group is composed of as many numbers as there are groups.

III. The differences between any two adjoining numbers of a series must obtain between the corresponding numbers of all the series.

IV. The initial terms of the series compose another series, as do the second, third, fourth terms and so on.

V. The differences between any adjoining numbers of these secondary series must also obtain between the corresponding terms of all the secondary series.

The foregoing rules may be illustrated by the series and perfect square shown in Figs. 36 and 39.

Following and consequent upon the foregoing interrelations of these numbers is the remarkable quality possessed by the "perfect" magic square producing series as follows:

If the entire series is written out in the order of magnitude and the differences between the adjacent numbers are written below, the row of differences will be found to be geometrically arranged on each side of the center as will be seen in the following series taken from Fig. 43.

3 - 4 -13-14-18-19-21-22-28-29-31-32-36-37-46-47
1 9 1 4 1 2 1 (6) 1 2 1 4 1 9 1

In the above example the number 6 occupies the center and the other numbers are arranged in geometrical order on each side of it. It is the belief of the writer that this rule applies to all "perfect" squares whether odd or even.

The following example will suffice to illustrate the rule as applied to a 5×5 magic square, Fig. 45 showing the series and Fig. 46 the square.

1 . 4 . 7 . 8 . 10 . 11 . 13 . 14 . 15 . 17 . 18 . 20 . 21 . 22 . 24 . 25 . 27 . 28 . 29 . 31 . 32 . 34 . 35 . 38 . 41
3 3 1 2 1 2 1 1 2 1 2 1 | 1 2 1 2 1 1 2 1 2 1 3 3

L. S. FRIERSON.

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UNIVERSALITY THE GROUND IDEA IN ETHICS.

The goal of all our thinking is some form of unity. Our data are always manifold, at least as soon as we actually become conscious of them; and the invariable impulse, whether in the service of practical ends or of theoretical ideals, is to seek their unity. Both science and philosophy embody this impulse. Science has glorified as its supreme achievements such approximations to unity as the laws of correlation of energy and indestructibility of matter. Philosophy may almost be defined as the search for the one in the many; and some form of monism has always been esteemed to be philosophy *par excellence*. We must believe that this native and inexpugnable impulse of our thought is in the deepest sense a copy or image of the real ultimate character of the universe. We strive for unity and the bond of things because the whole is one, and we belong to the one. In the terms of mysticism or devotion, we are simply yearning back toward our origin in the Divine Unity.

The idea of universality as the fundamental conception of all ethical truth seems to grow upon one as he contemplates more and more widely the field of ethical life. This idea is foreshadowed in the earliest and most elementary formulas of moral precept, negatively in Cain's guilty and bitter question, "Am I my brother's keeper?"—which the very asking shows to be no question, but rather a revolt and impotent opposition against what broke even upon a half savage mind as truth. All the precepts of moral sages, even the earliest, contain a central core of universality; just as all are summed up in the Hebrew "Love thy neighbor as thyself," and the word of the greater Hebrew, "Whatsoever ye would that men should do unto you, do ye even so unto them."

Ethical universality may be presented under three phases, those of *law, interdependence,* and *love.*

Law is the form in which universality first comes to consciousness in the race. Duty, righteousness, the moral life, are first entirely matters of law. This deed is right because it fits the eternal sanctions, the other is wrong because it contradicts them. Nay, right appears in a yet more primitive form than that of eternal and divine sanctions, namely the law of the king or chief, the expressed will of a seen and directly known power. But the idea of law soon transcends this particularity, as it must, by its very nature, transcend every limit to its inner and essential universality; and law presently

stands not for the will of any individual man, not even the king, but for the will of the eternal and all-ruling deity, for the "Thus saith the Lord!" Just here we must note, after Hegel, that the mere historical growth of this stage of universalization is of no fundamental interest. No doubt we may speculate that the law of the king's will passed through the death and apotheosis of the king into the law of the invisible and eternal One. The mere path by which law travels from its incipient imperfection and particularity towards its real and ultimate universality is of no deep import; it could as well, we must suppose, have taken a thousand other routes. The vital thing is the destination, or perhaps we should say the direction, of the movement.

The deepest essence of law in all its formulations and on all its stages is universality. We must not suppose that the lower forms of law are marked by any other distinguishing feature; it is always universality which makes law. A law in morals is something which is valid for you and for me, and for all others who are not explicitly exempted; that is, who do not escape from the law by some element in their relation to it. The imperfection in the law affects only the degree of scope of the universality; a lower form of moral law is due to a lower degree of insight. The earlier law exempts the king and the nobles, not by attacking the law itself, but by elevating the aristocrats above its reach, that is by marking them not mere men, but in a sense divine. Higher civilization consists in closer scrutiny of these claims to exemption. In fact, the very exemption is of the essence of the law, and so cannot injure its universality.

The sanctions of a law are at first inarticulate. That is, the moral stage in which morality is embodied in laws is, as it were, the childhood of moral theory and practice. Two great difficulties arise: first, that of the injustice of laws in their particular application, or rather the injustice of the formulations of the laws to which men have attained. Such knots arise most abundantly in even the earliest stage, when the king's word is law. The king pronounces, and alas! the law falls with fatal effect upon his friend or favorite; as, for example, in the myths of Jephthah or Daniel. Or laws seem to clash in irreconcilable opposition, as in the Antigone. From all this, repeated a thousand times, arises suspicion and not seldom revolt; an example of the latter is one element of the Greek sophists. And this leads to the second great difficulty as to laws, the inquiry into their *sanction*. It is evident that so long as the king lives, or belief in the divine author of laws is unshaken, no such inquiry can

arise; but the invisibility of the author, and more especially the conflict of the laws stimulates doubt and scrutiny. This inquiry leads to many forms of theory for sanction. We are here concerned with two ideas which seem to us representative of all that can be adduced in defence of laws, or rather of morals, and which are of the essence of the universality which is the basis of the laws and of the greater morality which is shadowed forth in the laws. These two ideas are interdependence and love. Both of these may be described as facts; both are in part and originally data; but they are both in need of enlargement and extension by means of postulation, or we may say faith, before they can function as sanctions in any complete manner.

First, then, interdependence.

If two things lie under one law they must exist under some common condition or in some organic relation. Interdependence emphasizes the organic relation; indeed it might be called interaction, for we soon learn to seek and find in all relations of interdependence an underlying, half hidden interchange of force or energy. Even relations apparently inert, as a stone resting upon the earth, turn out on scrutiny to be most attractive. Every molecule of stone and soil is thrusting and struggling, and what seems mere one-sided and stolid dependence is really an active and mutual interaction.

Now all our growing knowledge of the universe is an increase in our knowledge of interaction. Every new fact of science is a new piece of interaction. This is eminently true in anthropology in the large sense of the term,—the study of physiology and psychology lead to embriology and heredity, and to sociology. Body and mind are transformed by thought. What but now seemed to be stark individuals turn out to be of one piece and texture with all being, and in momentary commerce with all the elements. Consider the body. There it stands, erect, touching the earth but lightly, moving freely from place to place, leaping, walking, running. But take away for one instant that most universal of all laws of matter, gravitation, and that body, which seemed so self-sufficient, would do we know not what,—burst, dissolve, dissipate, without that pressure of the air, thrusting fifteen pounds upon every square inch, it could not hold together. Air to breathe and food are only less instantaneous, not less imperative indispensables. Indeed, when we call in chemist and physiologist to instruct us, we learn at once that the body is part and parcel of the great machine of the physical universe and is in constant, never-relaxing interaction of force and motion with the

world of nature. Its very constituent molecules are in momentary flux to and from the surrounding air and space.

Only more fascinating and convincing is the study of the real status of the man,—more strictly speaking, the inner man or mind. A glance at one's own soul reveals no isolated individual. I find in *my* mind father, brothers, wife, friends, home, country, and the heroes and sages of times past. I perceive that were it not for Homer and Socrates, Shakespeare and Bunyan, Lincoln and Gladstone, to say nothing of names less shining but more familiar and intimate, I should simply not be! It would actually seem that the interaction of the physical world has risen to a higher stage here, it has become *identity*. The old hero said, "I am a part of all that I have seen." In truth, we are all composite of all that we have seen, and chiefly, so far as we are men, and not mere intellects, we are made up of those souls whom we have known.

This is the indispensable foundation for any ethics. If a man were an isolated, self-complete and self-sufficing thing, walking apart, as it were, there were no conceivable reason in ethical relations or moral obligation. Only because we are all of one piece, of one stuff, in ceaseless and deep-seated interaction, are we bound by common law of mutual obligation.

But if the social body had been compelled to depend upon the intellectual conception of interaction and mutual dependence for a system of morality and righteousness, there never would have been any social system, and that for two reasons: first, the knowledge would have come too late, or rather, it could not have come at all; for such high intellectual progress is possible only after the long process of actual moralization of society, and hence as a consequence of that for which it is proposed as a basis. In the scheme of things another agent was provided, namely the immediate perception or sensation of the identity between each man and his fellows. This agent we call love, or sympathy. Here we may remark that all through the history of the science of ethics, while the sages have been engrossed and too often disputing over the philosophical sanction of morality, the saints, of all types, eminent, and obscure, in caves and hermitages, or in the maelstrom of life, have been calmly and completely assured, in heart and life, if not in intellect, that this love is the all-sufficient guarantee of all the moral laws. And since they found love among the all-certain things in their inmost hearts, they have not been anxious to base it upon any philosophy, but have rather built their philosophies, if any, upon the datum of love; or

at the very least, have required the theory of being to square itself by the principle of life.

To return to the disabilities of the theoretical knowledge of interdependence,—we have said that this knowledge would have come necessarily too late, being itself one of the fruits of a social state already well developed. Its other disability is just as complete—it is utterly impotent to do the work. It is an intellectual conception, and as such it lacks the very driving force which is indispensable in a sanction; not indeed in a philosophical sanction, whose only function is to explain, but in a practical sanction which need not so much explain, indeed does not explain in any scientific sense, but must *impel*. We have called love the sensation or perception of the social interdependence or identity, but it must be remembered that this agent is like all sensations commonly so-called, essentially *motor* in its nature. It impels, often with only the vaguest and most obscure illumination of the reason. It has its first origins and shows all its essential qualities in those blind instincts of the mere animal, like mother love in bird and beast.

We cannot but wonder at the comparative neglect which the philosophical moralists have shown toward love. Perhaps we may not blame the ancients, since the practical idea of love was so imperfectly developed, and we must agree with Hegel that no philosophy can anticipate its own time. But surely the ethical thought of the Christian era should have penetrated more deeply into the nature and ethical function of this central ethical experience,—for such love is, all apotheosis of duty to the contrary notwithstanding, even that of the immortal Kant included. The practical moralists, the saints properly and broadly so-called, have recognized the principle, as we have already remarked.

We would not pretend to any deep or final utterance on this great theme, but must add one word of supplement and as it were correction to what we have already said of love. We have called it the immediate perception of our mutual dependence and identity, but really it *is* that very dependence and identity,—as indeed every perception *is* the thing perceived. Love is the bond or unity of which all laws of morality and all formulas of universality are partial struggling expressions.

We may venture then, in conclusion, to indicate in such vague manner as is possible the relations of the three forms or phases of universality: law, interdependence, and love.

Law is the striving of the human spirit to set forth and express

in terms of conduct, of practical reason, to use the honorable and useful Kantian term, the inner, real unity of human beings. Its essence is always this universality; its accidents are the effect of varying degrees of insight into the meaning and validity of the terms in which the law is expressed; especially in its interpretation of external and individual human relations to which the law must take attitude.

Interdependence is the conception of the unity after the type of our intellect; that is, in terms of the speculative reason. Hence this conception is much influenced by the methods and ideals of our general science and philosophy. This conception sets the type for all really explanatory ethics. It seems clear that no theory of duty and the moral law can be competent which does not construct some consistent and reliable conception of unity among those who are mutually bound by the chains of duty.

Love is the reality of which these, law and interdependence, are formulas and theories; or in another view love is the immediate gift or knowledge of the reality, a gift without which the very beginnings of moral and social life were unthinkable.

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THE ENDEMIC RELIGIOUS INSANITY OF THE ISLAND OF ST. VINCENT.

In the island of St. Vincent, West Indies, has been prevalent for some years a system of religious exercises practiced by a sect commonly called the "Shakers." The devotees speak of themselves as the "Converted" or the "Penitents."

It must be understood that these people do not profess or hold any distinctive doctrines. The fundamental idea of their worship is the necessity for "Conversion" in the sense taught by the Wesleyans, Salvation Army, Plymouth Brethren and other allied forms of Christianity. They do not aim at establishing an independent sect, nor do they count themselves as separated each one from his Church.

The chief teacher, Brother Ragguet, expressly repudiates such an idea. He preaches repentance and contrition, but directs every one to cleave to his own religious body. He holds that all churches are true except that of the Seventh Day Adventists, whom he calls

"Babblers vexing the Church." The teachers of the Penitents profess only to guide the sinner to repentance, to assist him in obtaining forgiveness and peace, to correct him for lapses and to keep him in possession of the right spirit. Among the members therefore are persons belonging to the Anglican, Wesleyan, and Presbyterian bodies.

There is nothing reprehensible in all this in theory. In fact, however, the fascination lies in the emotional excitement produced by the rejoicing at the possession of salvation and in that psychical erethism, which in so many forms of religion is attributed to divine inspiration. The doctrine of conversion and the resulting states of mental exaltation have been long familiar to the negroes through the Wesleyan revival meetings.

The practices of the Penitents are thus a direct outcome of Wesleyan Methodism; and their extreme manifestations do not surpass the excesses to be seen at the Wesleyan revival meetings in Tortola in the Virgin Islands. The emotional phases of Methodism are, I believe, now-a-days deprecated by most ministers and cultured adherents of that Church. But they are unhappily so natural to the temperament of the uneducated and hysterical negro race, that this spontaneous adaptation of them by the St. Vincent Penitents finds a fertile soil for its spread.

As far as the writer can ascertain Brother Ragguet has been the greatest exponent of the methods of the Penitents. Charles Kingsley mentions the existence of Shakers in St. Vincent, and Ragguet and Mrs. Baptiste, the two most venerated teachers of this day, admit having received their ideas from a former teacher. The writer has cultivated the acquaintance of Ragguet for some time with the view to learning somewhat of the inwardness of the movement. He is an albino negro of hideous appearance. His face and neck are covered with freckles and incipient rodent ulcers, and he has a well developed epithelioma on the cheek. This he has not yet been persuaded to part with.

Mentally he is a typical mattoid without education. His manner is intense and earnest, his eye insane, his voice loud and strident. He presents the megalomania of the mattoid, the oneness of idea, the persistence of purpose, the power of influencing the masses. He will not wear shoes because the angels do not. He says he is "the Apostle of the Work" in St. Vincent. "I am an angel upon earth," he said to the writer with all seriousness. He prophesies. He claims to have prophesied the earthquakes and volcanic eruptions

of 1902; and the peasants and some better than they believe him. Ragguet is not now in communion with all the Penitents of the island; he disapproves of the pretensions of most of the teachers. He only affords his countenance to two of the "praise-houses," but preaches in the streets and market-places.

The whole system as carried out in St. Vincent is no doubt the product of an evolution and was not devised by any one person. There are perhaps differences of detail in the methods of the teachers. But as teachers and members very frequently visit from place to place to assist at meetings, the practices must be fairly uniform. The songs used are certainly so.

Services are held every Sunday night in "praise-houses," of which there are over twenty in the island. These places are thatched huts with open sides and hard trodden earth floor. Any one may attend the meeting and join in the singing and rejoicing. Where there is a large membership or in the neighborhood of a teacher there is a "penance house," commonly with two apartments for the separation of the sexes, or there may be two huts. One informant, a policeman, affirms that he once entered a penance house and found several persons of both sexes asleep, worn out, he conjectures, by their prayers. When the penance house is occupied a white flag is shown on a staff.

Every person desirous of joining the membership must spend a period of "moanin" in the penance house. He is then said to be "on the knee" or "bruising the knee." Each candidate brings three shillings in cash, some candles and a bottle of olive oil. During the whole time of "moanin" (probably corrupt for "mourning") the candidates remain in the penance house. An attendant, who for the females is called a "nurse," prepares their food. Only salt fish, plantains, olive oil and bread are allowed.

On their admission the teacher comes to "point" the candidates. They stand in a row with the elbows bent and the palms upwards, Each has a lighted candle before his feet. Absolute silence is enforced and the initiate gazes at the candle and abstracts himself to "pray in the heart." When weary he may kneel and rise again. Thus he may remain several hours on end. He usually "goes from himself" while so standing.

Each day this is repeated. The rest of the day is supposed to be devoted to meditation. At night the initiates lie flat on their backs. It is admitted that conversation does take place, but it is not supposed to, and they believe that the teacher by his power knows of it.

Occasionally the teacher visits to pray with and counsel his disciples. It is stated that the teacher sometimes visits the females at night, but a converted woman in describing her experience says the nurse always came in with the teacher.

The hypnotic intent of the process of "pointing" is obvious, as well as the silence and mental abstraction enjoined. It is astonishing that so effectual a method could have been unconsciously evolved.

The negro seems to be more readily influenced by suggestion than the white. The writer finds 87 per cent. of pure negroes are hypnotized at the first attempt by the methods of Nancy, as against 80-84 per cent. susceptible at all in the experience of European hypnotists.

If a disciple has offended his parents it is supposed that he is continually confronted by them in his visions, and can make no progress until he returns home and gets their forgiveness. Also one still under the control of his parents is not supposed to be received without their consent.

The process of initiation is commonly thought to last nine days, but it really goes on till the initiate hears a voice say, "Go thou in peace and sin no more." He cannot leave until thus dismissed in peace, and this often takes two or three weeks and has been known to take six weeks. The teacher is believed to be aware by occult means of the exact moment the words are received, no matter how far off he may be.

During the period of "moanin" one reviews all his sins and repents of them. He "travels" in visions. The presence of his teacher is not necessary for these visions, which usually take place at night. One sees places and persons unknown before. He may learn to speak in the unknown tongue, and it is supposed that those able to read and write learn this more readily. This tongue the converted pretend to understand, but say it is not lawful to speak it except at meetings. The initiate in his visions may have the power of second sight; he may see some one stealing, but does not speak of it, for that would needlessly put the culprit and his family to shame. A penitent thus describes one of his visions. "I thought I was on my back on the sand praying when there appeared a ship flying through the air. I asked to be taken on board and the ship backed and came to rest near me. As I stepped on deck the ship started gliding on the surface of the sea with marvelous swiftness. We came to another shore and I landed and went up a hill. I met three persons

who said they were called Adam, Eve, and Joshua. I then saw a goat coming and as it came near I saw it was marked with blood on the flank. It grazed on the pasture grass; then suddenly it changed into a woman nursing an infant."

In another vision he saw the District Medical Officer riding in a valley accompanied by his groom. They met a girl carrying fish, and when the girl would not sell, took them by force. The dreamer knew the girl and afterwards asked her about the incident but she said it had never occurred.

One of the converted mentioned that one member could know another "after he had understanding." On being pressed she admitted that there is a pass-word which is given at the penance house. Had an opportunity of private interview presented, the writer feels sure he might have elicited the word and tested its efficacy.

After coming "off the knee" the initiate wears a white band round his head for a month. He must keep to the same diet for nine days and during this time also he may not work. Every day at noon he should be at home to "rejoice." If that hour finds him away from home he must rejoice on the road or on the shore. Thus small parties are occasionally seen in the high-way in the country jumping together and shouting "Hip Houi."

The new member goes to the first meeting after his return home and on this occasion should sing a song which he has received in his visions or composed. Some of these chants catch on and form the hymnal of the sect. A few examples are given below.

In charge of every station with a penance house is a "teacher." These are credited with the power of second sight to the extent noted above, and also to the extent of knowing the backslidings of their members. At a smaller center there is a leader to conduct the meetings. Some one who professes that gift is a "spirit prover." He scans the members while working to note whether each has the right spirit. There is the "Holy Spirit" and the "Spirit of Antichrist." Another officer is called the "surveyor." It is difficult to get a clear idea of his functions; he is said to "survey the ground" before working begins. He certainly marks lines on the floor with chalk and some signs.

A meeting begins like an ordinary Wesleyan prayer meeting. Some pray, the leader starts hymns. The prayers at this stage during the meeting were considered appropriate and seemly by a Wesleyan minister. As the night goes on the members are warmed up; at the fit time the surveyor, it seems, marks the floor with chalk

and then the working begins. All jump together and shout "Hip Houi" in unison incessantly for hours. Some dance round with the usual erotic postural motions of the negro dances. Some speak "in tongues." Some in frenzy climb into the rafters of the building or on trees. An informant saw a man rush blindly from the praise-house, fall down a steep bank and get up as if nothing had happened, and rush away madly into the darkness. After a while he returned quiet. This frenzied shouting and dancing always takes place. It is called " working the spirit." On some occasions all the members form a procession round the room stooping forwards and shouting and jumping. This is called "riding Zion's donkey." Almost invariably one or more persons fall to the ground unconscious and writhing convulsively. If a woman falls some one ties her dress round her legs. This was found to be necessary to prevent the women exposing themselves.

It is claimed by the converted that if a member is in the right way he is never thrown down by the spirit. Outsiders joining in the rejoicing and members who have "fallen out of line" are so afflicted. Those that get the right spirit may jump and shout in the same spot all night.

Ragguet repudiates the idea that the spirit of God can cast a person grovelling and kicking on the ground. That he says is a devil. If a member falls his teacher flogs and beats him for his sins. Mrs. Baptiste who next to Ragguet is the most reverenced teacher jumps astride of the offender riding and pommeling him. It is said that a backslider so convicted may be sent back "on the knee." It appears that sometimes when a worshiper is seized with this convulsion the teacher places a lighted candle at his head and marks a cross with chalk at his feet, and then all pray till he comes round. This perhaps is done in the case of contrite persons not yet admitted to the membership. Smoking is absolutely prohibited at meetings. It is abundantly attested and admitted by members that tobacco smoke throws any one who has the spirit into convulsions. A Wesleyan minister saw a penitent under these circumstances rush forward and fall, nearly smashing his head against a post.

This scene of frenzied excitement usually lasts till 3 or 4 a. m. but has been known to continue till 9 a. m., say about twelve hours.

The power of Mrs. Baptiste is instanced in the following incident. While all jumped and shouted, her victim, a strong tall man, stood stock still trembling, and she danced round him. She marked the ground round his feet and placed a lighted candle be-

fore him. Then she ran a little way from him and back behind him. He fell to his hands and knees, and she leaped on his back riding him and sticking her elbows into his ribs. She reproached him with his faults "that frock you give that woman you should have given your wife" and so on. When she visits the village of Barrouallie some will not go to meeting, for when many have fallen in convulsions she leaves them to come to as they may.

If a member is conscious of sin, on entering the praise-house, he may go to each corner, mark the post with chalk and say a prayer. He thus makes atonement and may join in the working and get the right spirit.

When a member dies there is a prayer meeting held. Next night there is a wake, and on the ninth night a special meeting which is particularly fervid. The spirit of the departed brother is supposed to be present assisting.

On Easter and Christmas mornings the members at some country places march clothed in white and with naked feet and lighted candles.

From the above description it is evident that the psychical phenomena of Shakerism are due to hysteria and hypnotism and take their coloring from the religious enthusiasm of which they are a degeneration.

During the period of "moanin" the prolonged gazing at a light, together with the silence and mental abstraction, naturally produces hypnotic sleep. The attitude of expectancy determines the form of the dreams and explains the uniformity of the experience of the candidates in this state. The objectionable feature is of course the abuse of hypnotism, which increases the susceptibility of the subject to suggestion and enhances the tendency to hysteria. It may be questioned also whether the influence of the teachers acquired by these means and the slavish credulity of the converts are desirable elements in the mental life of the people.

The phenomena of the rejoicing are those of many of the epidemics of insanity, which from the earliest times have been known to spring from or be associated with religion. The leaping and shouting, the delirium and incoherent ejaculations, the flagellations and convulsions all have their parallels in the history of epidemic insanity.

We pass over the frantic rites in the worship of Cybele and Bacchus. Among Christian sects the Massabiani described by S. Epiphanus leaped wildly; the Acefales howled and barked in the

streets of Alexandria; the Flagellants starting from Perugia in 1260 spread their infectious madness over all Europe; flagellation characterized the religion of the Zaccharys of Abyssinia. The dance of S. Vitus affected Western Germany during the fourteenth and fifteenth centuries. It is described as "a convulsion which infuriated the human frame in a most extraordinary manner.... the Bacchantic leaps by which it was characterized, and which gave to those affected whilst performing their wild dance and screaming and foaming with fury, all the appearance of persons possessed."

This picture is reflected in many epidemics of that class to which Shakerism belongs and which are entirely religious in intent.

There may be instanced the Convulsionaries of Paris in 1731; the Barkers and Jerkers of America in 1798 to 1805, and the Revivalists of Ireland whose affliction resulted from the revival meetings; the epidemic of religious enthusiasm in Sweden in 1841; the Velonandrono of Madagascar as late as 1900; and the Dancing Dervishes.

Similar manifestations on a smaller scale and therefore more analogous to the case of St. Vincent are the Lata of Java, the Ikota among the Samoyede women, and the performances of the Klikuschi of Kursh, and of the Holy Rollers of Oregon in 1903.

All these endemic and epidemic affections like that in St. Vincent are characterized by a hysterical choreic or convulsive activity in companies, with wild incoherent speech, temporary unconsciousness of pain and surroundings during the paroxysm, sometimes coma afterwards. They are produced by religious excitement and propagated by imitation.

It must now be considered what effects the practices of the "converted" have or are likely to have on the subjects. The candidates on their discharge from the penance house are observed to be for some time in a dazed stupified condition. This is in part due to that preoccupation of mind which, as noted by Starbuck, often occurs during the conversion period of young persons. But in the penitents it would be undoubtedly accentuated by the repeated and prolonged hypnotism they have undergone.

It has been asserted that a large proportion of those committed for lunacy in St. Vincent have been Shakers. No statistics are available in support of this, but a former dispenser at the hospital assured the writer he knew of three such cases, and a corporal of police stated he had himself been in charge of two such. It is certain that religion takes the most prominent part in the coloring if not

also in the causation of attacks of insanity among West Indian negroes. The writer has observed that "penitents" are prone to hysterical activity when taking chloroform. Under the influence of the drug they shake the body and limbs rapidly or try excitedly to leap from the table after the first few whiffs of the anæsthetic. That epidemics of religious enthusiasm tend to produce individual attacks of persisting alienation, especially of hysterical insanity, is well known.

Dr. Gasquet in this relation says:

"But the influence of religion as an exciting cause of insanity is far more important in its action on masses of men than on individuals.... This injurious element appears to consist in encouraging cries and groans, dancing and contortions, in short bodily manifestations of any kind which are propagated by imitation."

It is certain that the exercises of the St. Vincent penitents do not lack this injurious element, besides the fact that the manifestations have become epidemic in the community and habitual in the individuals. The effect of repeated and prolonged indulgence in the orgies of frenzied emotionalism is in St. Vincent intensified by the degeneration of the nerve system of a population saturated with syphilis to an extraordinary degree.

Objection has been taken to the meetings of the penitents on the ground of the opportunities they afford for immorality. While the "penitents" do not affect marriage any more than do the rest of their class, and some even of the teachers are living in the concubinage natural to the negro peasants, yet it is certain that continence is enjoined and expected from the candidates. A member has been heard to reprove another for kissing his sweetheart before coming to meeting. He warned the culprit that he would get "a lash," and this actually happened, for he was overtaken by convulsions and accordingly soundly flogged as a backslider, while in that state. The writer has not been able to gather any evidence of immoral practices in connection with penitent services.

The close association between the erotic and religious feelings is so well established that it is not necessary here to do more than indicate this danger in the words of von Kraft-Ebing. He remarks "how powerfully sensuality expresses itself in the histories of religious fanatics, and in what revolting scenes, true orgies, the religious festivals of antiquity, no less than the 'meetings' of certain sect in modern times express themselves.'.....

"Owing to the correspondence in many points between these

two emotional states, it is clear that when they are very intense the one may take the place of the other, since every manifestation of one element of mental life also intensifies its associations."

This applies with particular cogency to the negro race, in which the sexual passions are stronger and the emotions at the same time more readily stirred than in white races.

When we consider also that in an uneducated class the powers of inhibition are deficiently trained, we arrive at the inevitable conclusion that the "rejoicings" of the penitents must very frequently end in episodes of sensuality.

While considering the similar manifestations of the Wesleyan Revivalism in Tortola, the writer was assured by the Registrar of Births that a noticeable rise of birth-rate took place nine months after the yearly season of revival.

One case has come to the writer's knowledge of a girl, who, becoming pregnant immediately after joining the penitents, continued to participate in the delirious jumping and was overtaken by a fatal abortion. This is a real danger, but perhaps not an important one.

On consideration of the foregoing facts and opinions, the question arises, is it not the duty of the Government to attempt to suppress or lessen a practice which it appears is prejudicial to the well-being of the community?

In facing the problem the Government will certainly be met with the cant cries of "freedom of worship" and "liberty of the subject." These terms have become fetishes of the British people and are hard to ignore. But it is well to consider if it is not erroneous to apply the principles of legislation belonging to the twentieth century to a community which in effect still lives in the Middle Ages.

There does not seem to be any less reason for limiting the spread of mental infection by interfering with the individual liberty, than for isolating a smallpox "contact."

At the present day also religions are not treated by students with any more reverence than they are individually entitled to, after being subjected to rational analysis.

Sir A. Helps enunciated a principle that a country is not free in proportion to the liberty of the individuals to act as they pleased, but in respect of the protection the majority enjoyed from the will or power of the individuals to do harm.

The hymns of the "Penitents" mentioned above are rather de-

void of meaning and consist mostly of conventional religious ejaculations and cant phrases. They are of psychological interest, however, as they illustrate the lack of mentality better than any description. They are soon corrupted so as to contain even less meaning when sung. The examples given below are taken down from persons accustomed to sing them. No. 7 was direct from the original composer.

1

"Oh come a' we go a happy lan',
Happy lan', Happy lan'
Come a' we go a happy lan'
Happy lan' of Canaan.
Weh milk an' wine an' honey deh
Honey deh, honey deh,
Weh milk an' wine an' honey deh
Honey deh a Canaan."

2.

"I heard a voice, believer, I heard a voice,
King Jesus bawl 'Glory hallelujah.'
You pray hard enough,
Glory hallelujah
You moan hard enough,
Glory etc.
You seek hard enough,
etc."

3.

"My dear companions, fare you well,
Glory of Victory!
I will not follow you to hell
Glory of Victory!
Blow, blow, trumpet of Sion, blow!
Blow, blow, trumpet of Sion, blow!
Glory of Victory!

4.

"Oh you see dem pipe smoker,
I ask dem weh dey bound to;
Dey tell me de wo'ld goin' ketch a fire,
Dey bound to dey promise lan'.
Oh you see dem rum-drinker,
etc.
Oh you see dem malice-keeper,
etc."

5.

"Moanin' Thomas weh you goin'?
To Alleluia, my Lord.
You mus' be clean wen you goin'
To Alleluia, my Lord.

You mus' be pure wen you goin'
To Alleluia, my Lord."

6.

"Walk in de light, for Jesus de light;
Walk in de light of de holy light.
Singing Alleluia. singing Alleluia
Of de holy light."

7.

"Wen me do moan, me one ah moan,
Alleluia, ring de bell fo' me!
Angel Gabriel very jubilee.
Alleluia, ring de bell fo' me!
Wen me do seek, me one ah seek,
etc."

8.

"Down in de valley weep an' moan
Praise God, honor, honor to his name!
Moses, Moses, take off dy shoe,
Praise God, honor, honor to his name!
De place you stan' is holy groun'
Praise God, honor, honor, to his name!"

C. W. BRANCH.

ST. VINCENT, WEST INDIES.

BOOK REVIEWS AND NOTES.

ZARATHUSHTRA, PHILO, THE ACHAEMENIDS AND ISRAEL. By *Lawrence Heyworth Mills*, Professor of Zend Philology in the University of Oxford. Chicago: The Open Court Publishing Co., 1906. Pp. xiii, 460.

The problem of the relation of Zoroastrianism, the religion of ancient Persia, to Greek philosophy and the faith of Israel is one of unusual interest, and to its solution more than one scholar has bent his energy. The names of Kohut, Stave, Söderblom, Böklen, Spiegel, Röth, and Gladisch at once recur to mind, especially as regards the supposed association of Zoroastrianism and Judaism. The question of the relation of the Iranian faith with Greek philosophy, on the other hand, received comparatively slight attention until the French scholar James Darmesteter formulated the theory that the Avesta was written during the early centuries after Christ and was profoundly influenced by Alexandrine philosophy. This theory, an unhappy aberration on the part of a great scholar, has found but little favor, and it is not impossible that he might later have modified his views, had he not been called away by death. Realizing this possibility, the majority of scholars have been content to record his hypothesis, and, without directly polemizing against it, to quietly supersede it by the almost obvious facts which render it plainly untenable. In view of the great services of Darmesteter to Iranian scholarship, this attitude seems eminently proper; notwithstanding this, Professor Mills deems the theories formulated by the French scholar not only erroneous but so dangerous as to call for a detailed refutation. To this object the first half of the volume under discussion seems to be devoted, and it must be conceded that the author has ably proved his contention and re-established the older hypothesis that Zoroastrianism was prior to the rise of Neo-Platonic and Alexandrine philosophy, and that it was, consequently, altogether influenced by it. Darmesteter based his theory in part on an alleged "letter of Tansar," supposed to have been written about 226 A. D., although the earliest form in which the document is extant dates from 1210. Around this Tansar a mass of tradition seems to have accumulated, for Mas'udi, a Perso-Arabic historian of the ninth century, terms him a "Platonist." The only fact certainly known concerning Tansar is that he "appeared with an exposition recovered from the Avesta, and was ordered to complete the scripture from that exposition. He did so accordingly, to preserve a similitude of the splendor of the original enlightenment in the treasury of Shapigan, and was ordered to distribute copies of the information provided" (Dinkart, in *SBE*, XXXVII, pp. xxxi, 414). The letter ascribed to this Iranian priest is plainly a literary embellishment of a kernel

which is probably historic. Parallels will readily suggest themselves from speeches recorded by classical writers. That Darmesteter should have given credence to so suspicious a document is indeed strange, and it is in itself significant of the weakness of his theory of the late origin of the Avesta. Taking up the letter in detail, Professor Mills distinguishes accurately between the historic and spurious elements in it. It is safe to say that the "letter of Tansar" will no longer be used as a serious argument in connection with the Avesta.

A far more serious problem is the question of Alexandrine influence on the Avesta, a theory also suggested by Darmesteter. In refutation of this hypothesis, Mills presents an elaborate study of the development of the doctrine of the Logos in Greek philosophy, paying special attention to the Philonian concept. One of the most noteworthy passages of Philo in this connection is his exegesis of Numbers xxxv. 6, where he explains the "six cities for refuge" as "the Divine Logos" (which he terms, however, a "metropolis" rather than a "city"), "Formative Power," "Kingly Power," "Power of Mercy," "the Legislative (city)," and "the Intelligible World." These "cities" Professor Mills compares in detail with the six Avesta Amshaspands, or "Immortal Holy Ones," Vohu Manah ("Good Mind"), Asha Vahishta ("Best Righteousness"), Khshathra Vairya ("Desirable Kingdom"), Spenta Armaiti ("Holy Concord"), Haurvatat ("Saving Health"), and Ameretat ("Immortality"). Admitting certain points of accidental coincidence, as is but natural, he shows conclusively that the divergencies both in detail and in spirit are far too great to admit of any influence of the one system of thought on the other. The Philonian Logos and "Powers" are essentially Greek, and the "Powers" themselves are rather demiurges, standing between God and matter, than the councillors and aids of the Deity, as are the Zoroastrian Amshaspands with regard to Ahura Mazda. The Amshaspands find their analogue, and, perhaps, their origin, in the Adityas and India, and they are ancient concepts, being, it may be suggested, primarily nature-deities. Nor does the Logos of Greek philosophy find any parallel in the Avesta, for the Philonian Logos is again a demiurge, while Vohu Manah or Asha, with whom the Logos presents occasional slight points of resemblance, works directly with Ahura Mazda in the active governance of the world. The concept of the demiurge, saving the Deity from contact with matter, is unknown to the Iranian mind. As Mills happily says (p. 119), "the Greek dualism was one between God and matter, whereas the Zarathushtrian was one between a good God and an evil God, each original and independent, matter not being regarded as in itself evil in any sense."

If the first half of Professor Mills's work is of special interest to philosophers, the second part appeals particularly to theologians. The contact of Persia with Israel was, politically at least, so close, that it has become the fashion, especially since the days of Kohut and Cheyne, to ascribe to Zoroastrianism the origin of the Jewish angelology and demonology. In considering the problem of the relation of the two religions, the author first shows the harmony of the Biblical edicts of Second Chronicles, Ezra, and Isaiah with the Babylonian vase-inscription of Cyrus. This text is well known and, taken in connection with the Old Testament and the Old Persian inscriptions, proves, it must be confessed, that Cyrus was, religiously speaking, little more

than a clever politician. The inscriptions of the Achæmenian kings themselves are subjected to a searching critique by Professor Mills, with the result that they are found to substantiate the statements of the Old Testament. This, however, is only what we should expect to find, especially in view of the author's excellent suggestion that the stereotyped phraseology of the Old Persian texts of Darius "actually cast more light upon the state of feeling at the time of Cyrus than the one extended inscription left to us by Cyrus himself has done" (p. 245). When, on the other hand, he advances the hypothesis that the Biblical phrase "Lord God of heaven" (e. g., Ezra, i. 2) implies that the deity of Cyrus was Deva, "He of the shining sky," it is difficult to follow him, for *daēva* (the Iranian equivalent of the Sanskrit *dēva*, "god") means only "demon." This, fortunately, does not interfere with the course of the argument presented by the author, particularly as Ahura Mazda, the supreme deity of the Iranians, and repeatedly mentioned in the Achæmenian inscriptions, was essentially a sky-god.

That the Iranian dualism was well developed at an early period is clearly shown, as Professor Mills points out, by the implied, though veiled, attack on this doctrine in Isaiah xlv. 6-7: "I am the Lord, and there is none else. I form the light, and create darkness: I make peace, and create evil: I the Lord do all these things"—an emphatic denial of the dualism which was a cardinal feature of Zoroastrianism, and which may have existed (although we lack specific data to prove the supposition) in Persia in the days of Cyrus and Darius. At a later period, pre-eminently in Gnosticism, dualism was fated to become a religious doctrine of wide acceptance. Yet is dualism in Judaism and Christianity necessarily Persian in origin? Did not the serpent strive against God in the Garden of Eden? If dualism found acceptance among the Jews and Christians, so that Satan is "the prince of this world" (John xiv. 30), it was, it may be suggested, because the germs were already present before the Jews came into contact with the Persians. The same statement holds good, it may be suggested, with regard to Satan as parallel with the Persian Ahriman, and also in respect to the Jewish angelology and demonology which many hold to be borrowed from the Iranians. Professor Mills touches comparatively lightly on these and similar problems, yet it would seem that he somewhat overrates Iranianism in its influence on Judaism. Nevertheless, his work marks a distinct advance. On the other hand, he might have made a more thorough study of the purely Semitic side of the Jewish religion, especially in its relations to Babylonia and Assyria, thus showing, perhaps, that certain elements in Judaism, supposed by many to be Persian in origin, are actually purely Semitic in source.

One of the most admirable sections of this important book deals with the moot question of the relationship of the Old Persian religion, as represented by the inscriptions of the Achæmenians, with the Zoroastrian religion. The majority of scholars incline to the belief that the Achæmenidæ were Zoroastrians, the present reviewer being one of the few who maintain that while these kings were worshipers of Ahura Mazda, there is no evidence to show that they were adherents of the reformed Iranian faith taught by Zoroaster. It is particularly noteworthy, accordingly, to find Professor Mills reaching the conclusion that, although there are many points of contact between the religion described in the Old Persian inscriptions and the Avesta,

"upon absolute identity we must not waste a thought" (p. 291), for the Zoroastrian and Daric creeds were distinct and separate (p. 329). Here, in discussing the parallelism in diction between the Old Persian inscriptions and the Avesta, attention might be called to the still more striking analogies between the phraseology of the Old Persian texts and the Assyro-Babylonian inscriptions, the latter exercising a strong influence on the style of the former. That Darius recognized the existence of a demonic opponent of Ormazd, as Professor Mills points out, is a view which cannot well be denied, and the Achæmenian monarch also knew the Amshaspands in all probability, especially if these archangels were originally nature-gods. The author's close analysis of the character of Darius, as revealed by his inscriptions, is likewise of exceptional interest.

The concluding pages of the book under consideration are concerned with an investigation of the date of the Gathas on the basis of internal evidence, a clinching of the argument of the earlier portion of the work. This date he sets between 650 and 900 B. C. According to Iranian tradition, which in this case, at least, seems to be well founded, Zoroaster, the probable author of the Gathas, was born in 660 B. C. and died in 583. While Professor Mills prefers the earlier date, the bulk of evidence seems to favor the latter. He is in accord, however, with the best views on the recrudescence of the popular Iranian faith after the subsidence of the reform inaugurated by Zoroaster. The final pages are, as the author says, an "apocopated report," and treat of the relations of Judaism and Zoroastrianism. This part of the book is not worked out in the detailed and profound manner which characterizes the admirable pages which precede it—it is, indeed, rather a collection of notes. Yet, if it is, as all will hope, a promise of good things to come, and the precursor of a new work from Professor Mills, so preeminently fitted by his mastery of the Old and New Testaments and of the Avesta and Pahlavi writings, there is a wealth of promise in these few pages. Nevertheless, here again the need of the study of Babylonia and Assyria must be emphasized, lest true Semitic elements in Judaism be interpreted as Persian, and some consideration should also be given to Talmudic and Midrashic literature. Again, is it not possible that Semitic (though not necessarily, or even probably, Hebrew) influences have been at work in the Avesta itself, vague and uncertain though these hypothesized factors may be? At all events, a complete study of the problem of the relation between Zoroastrianism and Judaism must take this contingency into account, even though it lead only to negative results.

Throughout the work runs evidence of intense enthusiasm for the subject and deep study of the theme. A worthy successor of the same scholar's editions and translations of the Gathas, it will take its place among the books which are indispensable to the student of Iranian thought; and more than this, *Zarathushtra, Philo, the Achæmenids and Israel* rightly emphasizes, for the first time in English, the importance of the Avesta and of the Old Persian inscriptions for the Christian theologian. LOUIS H. GRAY.

CHINESE MADE EASY. By *Walter Brooks Brouner, A. B., M. D.,* and *Fung Yuet Mow.* New York and London: Macmillan Co., 1904.

Chinese Made Easy is a book that will be welcome in many quarters, even among those people who never intend to go to China. Some years ago the

reviewer himself was forced into a study of Chinese by his interest in a comparative study of the development of human thought. The Chinese are in many obvious externalities so different from us; their methods of thought, their language and their customs diverge so much from ours that they seem to belong to another world with which we have nothing in common. The sad results of this strangeness which has been shown in the intercourse between the Middle Kingdom and all the Western nations without exception, are misunderstandings, quarrels, bloodshed, and a mutual distrust. Yet the Chinese are possessed of the same human sentiments, aspirations and ideas as we are. It is only the outside that differs, and a knowledge of their language has become imperative not only for commercial, political and other practical reasons, but also for theoretical considerations. We will understand ourselves better if we become acquainted with a parallel development which seems so different and yet at heart is the same.

Though the difficulties of studying Chinese seem at first sight to be insurmountable, in many respects the language is not so hard as the strangeness of its appearance would indicate. And here we have before us a very able attempt at making Chinese easy. Dr. Walter Brooks Brouner, with Fung Yuet Mow, a native Chinese missionary at his elbow, has succeeded in the compilation of a very handy text-book, which is almost sufficient to take the place of a school by correspondence, and which would actually be sufficient for students who study the Chinese for its literature only.

The reviewer who has had some experience in approaching the intricacies of Chinese script and language, regrets only that the book did not appear ten years ago, for it would have saved him many a weary hour and much search in the unwieldy Chinese Dictionary.

The present book is prefaced by no less an authority than Herbert A. Giles, M. A., LL. D., the author of the most recent and up-to-date Chinese Dictionary, and of a manual of Chinese literature and kindred subjects.

The contents of the book begin with lessons of easy words, such as a child may understand and remember at a glance,—such words as, one, two, three, earth, student, king, life, gem, man, begin, great, heaven, husband, etc., etc. We wish it contained also a few etymological explanations of the several Chinese characters such as the writer himself offered in his recent article on "Chinese Script and Thought" (in *The Monist*, Vol. XV, p. 271) and we hope that this desirable feature may find a place in a future edition of the book.

The pronunciation of the Cantonese dialect is transcribed according to ordinary English requirements, not according to the current method of Wade, which for many reasons does not recommend itself, and is a kind of compromise between English, German, French and other modes of transliteration.

Chinese children begin the study of their own language by reading the *Three Character Classic*, which incorporates nearly all the words in common and daily use, and at the same time contains the gist of Chinese morals and ideas.

The authors of *Chinese Made Easy* have done well to incorporate this famous school book in big plain characters with transliteration in Cantonese, English translation, and brief footnotes which are indispensable to explain to the reader the many historical allusions.

It is a book which the reviewer himself chose as his text-book when he began to study Chinese, and he made a new English translation which appeared in *The Open Court*, together with specimens of the Chinese text and some explanation of the characters. We had at the time contemplated the publication of the *Three Character Book* in pamphlet form, but the difficulty of the Chinese text, lack of time, and the conviction that some resident of China might do the work better, have prevented its execution. We are glad now to see this Chinese school book made accessible to the English people, and only wish that the notes in some instances might have been a little more copious, or at least that references had been given as to where to find further information on the subjects mentioned in the Chinese text.

The rest of the book is devoted to practical information for the Chinese student. It contains collections of words on man's social, political and civil relations, his mental disposition, names of public buildings, places of business, public institutions, the furniture of the house and stable, etc., tools, wearing apparel and food. There are also specimens of a Chinese English Dictionary, samples of Chinese poetry, and lessons in Chinese writing.

Considering the difficulty of publishing a book of this kind, with its innumerable Chinese characters, the price of the book (6 shillings 6 pence) must be considered cheap. It is a striking looking volume, neatly bound in gold and red in large octavo.

PRINCIPIEN DER METAPHYSIK. Von *Branislav Petronievics.* Erster Band, erste Abtheilung, Allgemeine Ontologie und die formalen Kategorien, mit einem Anhang, Elemente der neuen Geometrie. Heidelberg: Winter, 1904.

A new rebellion against the traditional authority of Euclid and his space-conception is published by Dr. Branislav Petronievics, a Russian scholar and thinker who is building up a new system of metaphysics. The present volume is intended to prepare for the philosophy of the author who in order to lay the foundation of his new system of metaphysics deems it necessary first to overcome the current conception of continuity in mathematics, and to replace it by a discontinuous space-conception.

The present volume is devoted in part to geometrical theorems. The great bulk is devoted to metaphysical speculations. The author argues that the main fault of philosophers and geometricians has been to regard the point as lacking extension, and he rejects Aristotle's view that two points can not touch because they would coincide. A point, according to Petronievics is not unextended but merely a minimum of space, and he claims that the old view of a point as a boundary is due to a confusion of thought. Our author distinguishes between the real point and the point as a boundary; two points touch if their boundaries are in contact and the points of contact which are unreal he calls boundary points in distinction from real points possessing a center and occupying a minimum of space.

Space according to Dr. Petronievics is not a magnitude independent of things but it is the juxtaposition of things, the mere order in which the contents of the world are placed. This juxtaposition, however, is not a continuum, for the continuum if it existed would be a negation of space, and so

space in order to exist must be discrete, which means it must consist of indivisible particles, a proposition which he endeavors to prove. The innovation is admirable; it beats Riemann's curved space, and also Bolyai and Lobachevski. Even the believers in the fourth dimension must confess that they are left behind. It is ingenious, original, and bold. We almost wish it were logically tenable.

Though Dr. Petronievics is not a mathematician by profession, he deems it necessary for the establishment of his metaphysics to clear the way by propounding a new geometry based upon the idea of a discrete space-conception which starts with assumptions different from Euclid's, and defines the point in any ultimate, simple and indivisible part of space. The center point is called the real point filled with existence of some kind while the boundary point is the unreal, empty, and non-existent space between two points. Two points touch if they are not separated by any intervening point of space. It is interesting to note the changes which Dr. Petronievics introduces in his new geometry of discrete space, but the world of science is conservative, and we do not expect that this new geometry will replace the old-fashioned Euclidean method.

PSYCHOLOGISCHE STUDIEN. Herausgegeben von *Wilhelm Wundt*. Leipsic: Engelmann, 1905. Price, 3 marks.

In February, 1905, Professor Wundt began editing this series of Psychological Studies, which appears at regular intervals, and of which six numbers form a volume. This series is really a continuation of the Philosophical Studies, the last number of which in February, 1903, marked the close of the eighteenth volume. Psychologists will welcome this revival of Professor Wundt's activity, and the limitation of subject matter to the one branch will greatly increase its value along this line. After the editorial forword the first number opens with a contribution to memory research by Fritz Reuther, and contains several minor communications besides. Other contributions in the early numbers are by Robert Bergemann and Stanislaus Kobylecki.

COURS DE CHIMIE PHYSIQUE. Suivi d'applications à la chimie et à la biologie. Par *Victor Henri*. 1r fascicule. Paris: Hermann, 1906. Pp. 336. Price, 15 francs to subscribers of the whole work.

This elementary course in physical chemistry is offered for the benefit of readers possessing only elementary notions of chemistry and physics. The use of advanced mathematics has been reduced to the selection of a few very simple expressions, and even these are not indispensable to the comprehension of the whole. In each chapter the author points out: (1) the methods of measure by means of which the given phenomenon is to be considered; (2) the experimental results; and (3) the hypothesis and general theories which make it possible to combine these results with those obtained by other methods.

The chapters contained in this volume, which is only the first instalment of a large work, treat the following subjects: general conditions of the equilibrium of solutions and their electrical conductivity, the theory of ions, osmotic pressure and diffusion of solutions, cryoscopy, tonometry and ebullios-

copy, dissolution and absorption, superficial tension and viscosity, the optical properties of solutions, and electrical phenomena in solutions.

LES ORIGINES DE LA STATIQUE. Par *P. Duhem.* 1st vol. Paris: Hermann, 1905. Pp. lv, 360. Price, 10 francs, $1,90.

Professor Duhem of Bordeaux states in the preface of this work, that it lacks something of the system which might seem desirable, and which he intended it to possess. This, he says, is due to the fact that his earlier studies and preliminary reading on the history of statics was entirely overthrown by his later researches into the subject. For instance, he discovered that it is not true, as has been commonly supposed, that the work of Leonardo da Vinci which was so rich in new mechanical ideas, was entirely unknown to the geometricians of the Renaissance.

This volume begins the study of statics in the time of Aristotle and Archimedes, while the second and third chapters are devoted to Leonardo da Vinci and Jerome Cardan of the fifteenth and sixteenth centuries. Chapter 4 is devoted to the impossibility of the idea of perpetual motion and is followed by a discussion of the statics of the Middle Ages and their Alexandrian sources, including writings attributed to Euclid. The Mediæval knowledge of statics as represented by Jordanus de Nemore and Leonardo da Vinci is followed by the reaction against Jordanus. A chapter is devoted to Galileo and one to Simon Stevin, and the volume closes with the history of statics in France up to the time of Descartes.

PSYCHOLOGISCHE STUDIEN. Von *Theodor Lipps.* 2d ed. Leipsic: Dürr, 1905. Pp. 287.

Theodor Lipps, the well-known psychologist, has revised and enlarged his psychological studies which now lie before us in their second edition. He discusses in them the main problems or theories of vision, the problems of the blind spot including corporeal vision, the theories of tones and the rhythm of tones and finally Weber's law. All the essays are written in an attractive style, and it would be desirable that at least parts of the book should be translated into English so as to render the ideas of Lipps more accessible to the student of psychology.

PSYCHOLOGIE DE DEUX MESSIES POSITIVISTES SAINT-SIMON ET AUGUSTE COMTE. Par *Georges Dumas.* Paris: Alcan, 1903. Pp. 314.

The present book on the two positivist Messiahs will be interesting to both philosophers and sociologists. It is a psychological analysis of the ideals, aspirations and lives of Saint-Simon and Auguste Comte, the two prophets of a new social order which would discard the Catholic Church and replace it by a positivist religion; which would substitute for priests, savants and scholars, and for feudal nobility an aristocracy of the mind and intellectual superiority. The dreams of these idealists have not been realized, and yet they exercise a great influence upon our age. Dumas, a psychologist of unusual acumen, here analyzes the sentiments and thoughts of these great leaders, and we learn to appreciate their ideals as well as to understand their failures.

L'ANNÉE BIOLOGIQUE. Comptes rendus annuels des travaux de biologie générale publiés sous la direction de *Yves Delage*. 8me année, 1903. Paris: Soudier, 1905. Pp. xxiv, 475.

The value of this annual to specialists in biological lines cannot be overestimated. Published under the direction of perhaps the first authority in France, it contains carefully prepared notes on each article that has appeared in English, German, French or Italian from the pen of any biologist worthy the name. Immediately after the table of contents there follows a short résumé of each chapter calling attention to the most valuable treatments of that particular subject. Each chapter treats of one special phase of biological interest and consists of a comprehensive bibliography of work written in that department during the year, followed by a short signed review of each article listed. The chapters are on the following subjects: The Cell; Sexual Products and Fecundation; Parthenogenesis, Teratogenesis; Asexual Reproduction; Ontogenesis; Regeneration; Grafting; Sex and Secondary Sexual Characteristics; Metagenetic Polymorphism; Latent Characters; Correlation; Death; Morphology and General Physiology; Heredity; Variation; Origin of Species; Geographical Distribution; Nervous System and Mental Functions; General Theories.

THE JOURNAL OF ABNORMAL PSYCHOLOGY. Edited by *Morton Prince, M. D.* Boston: Old Corner Book Store, 1906. Price, $3.00 or 12s. 6d. per year.

This is a new periodical published bi-monthly in the interests of psychology and medical science, and its board of associate editors consists of the following well-known men, Hugo Münsterberg, J. J. Putnam, A. Hoch, Boris Sidis, C. L. Dana, and Adolf Meyer.

It is designed that this Journal though printed in English shall be international in character. It is primarily intended for the publication of articles embodying clinical and laboratory researches in abnormal mental phenomena. The field of investigation includes hysteria, hallucinations, delusions, amnesias, aboulias, aphasias, fixed ideas, obsessions, automatisms, alterations of personality, multiple personality, dissociation of consciousness, subconscious phenomena, relation of the mind to physiological processes, neurasthenic and psychasthenic states. The Journal will also contain reports of the current literature in the field of psychiatry and allied subjects. The first number (April, 1906,) contains a discussion of the treatment of hysteria by Dr. J. J. Putnam of Harvard Medical School, "The Pathogenesis of Some Impulsions," by Dr. Pierre Janet, of the College of France; "What is Hypnosis?" by Prof. W. v. Bechterew, of St. Petersburg, and "The Psychology of Sudden Religious Conversion," by Dr. Morton Prince, of Tufts College Medical School.

PHILOSOPHIE DER BOTANIK. Von *Dr. J. Reinke*. Leipsic: Barth, 1905. Price, 4.80 marks.

The time is past when philosophy was held in contempt by naturalists, and the tendency is now again in favor of connecting the several branches of science, not only among themselves, but also with a general world-concpetion, thus restoring philosophy to her own. Professor Reinke, of Kiel, has performed this task for his specialty, which is botany, and we note in his work

a strong conservative tendency which may sometimes surprise the iconoclast, but will be received with great satisfaction in many quarters. It is a matter of course that Professor Reinke remains a scientist and does not revert to any narrow dogmatism of the churches, but we are glad to find in his speculations an appreciation of the religious problems, especially of the soul and of God, although we can not endorse his particular views. Among other details we deem his arguments against spontaneous generation and in favor of the act of special creation insufficient, and we would not accept his views of the cosmic intelligence, the nature of the soul, and the possible existence of an unknown soul substratum.

Professor Mills has edited "The First Chapter of the Pahlavi Yasna" in the October, 1906, number of the *Muséon* of Louvain University, Belgium, an ancient seat of Catholic learning. This lies doubly in the line of Mr. Mills's official duties, for the work has never been edited by another scholar before with the collation of manuscripts, and it is now prepared from all of them, and chiefly from those acquired by the author for the Oxford University Library. An earlier form of this edition from the same writer appeared as deciphered in the publications of the German Oriental Society, a year or two ago; but here it is printed in the costly Oriental character, and with all the variants given. The typesetter and printer is Mr. J. B. Istas of Louvain, the publisher of the *Muséon*. The expense must have been quite considerable as the article reaches 28 pages. It is very sightly, and will be useful as a text-book on this chapter. It was executed at the repeated invitation of the editor of the review. Professor Mills has now nearly finished the editing and translating of all the Pahlavi texts of the Yasna, his especial task.

These texts have appeared chiefly in the *Zeitschrift der deutsch-morgenländischen Gesellschaft,* Chapters LVII-LXI having been accepted, and will appear in due course.

The intermediate portion appears of course in his Gāthas. It has been an exceedingly laborious task, and one from which all European Zendists since Spiegel seem for the most part to have shrunk. In Pahlavi one perpendicular stroke represents five different letters with no possible means of discrimination save the context. It seems to be more harassing than Assyrian in some respects.

Such letters as *ufyā* and *nepesh* are written with the same signs and the person who wrote them could not later tell which word was meant but for the context, and unless he especially recalled what his former intention had been.

The *Journal of the Royal Asiatic Society* has been printing the English translation of the texts continuously, and the author was much gratified at the remarks of Lord Reay, the President of the Society at the last anniversary meeting, which were published in the July number of the *Journal.*

The works which have appeared in these journals from time to time will be reprinted in book form as soon as possible.

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